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REPORT OF THE INDIAN COALFIELDS' COMMITTEE

1946

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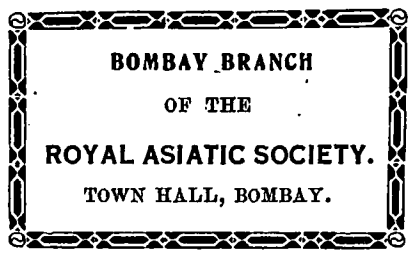

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CHAPTER I

INTRODUCTION

The Indian Coalfields' Committee was appointed by the Government of India, Department of Supply (now Department of Industries & Supplies), under Resolution No. Coal 119 (1), dated the 4th December, 1945, which is reproduced below :—

" In the last 25 years, three Committees were appointed by the Government of India to enquire into and report on certain defined problems affecting the coal industry in the country. The first of these in 1920 dealt with Mr. Treharne Rees' recommendations for avoiding waste of coal deposits due to defective methods of extraction. A subsequent Committee in 1925 had the more limited objective of proposing measures necessary for stimulating the export of suitable coal from Calcutta to Indian and foreign ports. A third Committee in 1937 reported on measures deemed necessary both for the prevention of avoidable waste of coal deposits and for securing the safety of those employed in the extraction of coal.

A number of recommendations made by these Committees have been implemented by Government, but others have not been acted upon, primarily because they were not considered, at the time, feasible or expedient.

2. A great deal of attention has been focussed on the coal industry in recent times all over the world. The experience of coal problems in India during the war, especially since the introduction of control over production and distribution, has emphasised the need for vigorous action in respect of both conservation and rationalisation if the coal industry is to play its full part in the economic replanning of the country. The Government of India consider that the time is now opportune for a comprehensive review of the recommendations made by previous Enquiry Committees which have not hitherto been implemented ; in addition, investigation of certain fresh problems is also necessary. They have accordingly decided to set up a small Committee to go into the questions set forth in the following terms of reference :—

' (1) To review the recommendations made by the various Committees dealing with the problems of the coal industry which were set up by Government from time to time and to consider—

(*a*) which of these recommendations have been adopted and with what measure of success ; and

(*b*) what further action needs to be taken by Government in respect of the recommendations which have not been adopted or which have been adopted only in part.

(2) To consider and to report what further economic and administrative measures are necessary to deal with the problems of the industry of a non-technical character and, in particular, to report on the conservation of high grade metallurgical and steam coal, the problem of fragmentation of colliery holdings, the opening of new fields, the economics of the coal industry and the stabilisation of coal prices. '

3. The Committee will be constituted as follows :—

Chairman

Mr. K. C. Mahindra, lately Head of the India Supply Mission, Washington.

Members

Mr. C. A. Innes, Partner, Messrs. Andrew Yule & Co., Ltd.

Mr. K. C. Neogy.

Mr. M. Ikramullah, I.C.S., Joint Secretary to the Government of India, Supply Department.

Secretary.

Mr. P. R. Nayak, M.B.E., I.C.S., Deputy Secretary to the Government of India, Supply Department.

The Committee will be assisted in Technical matters by the following Assessors :—

Mr. J. R. Harrison, O.I.E., Deputy Coal Commissioner (Production).

Khan Bahadur G. Faruque, O.B.E., Deputy Coal Commissioner (Distribution).

Mr. W. Kirby, C.I.E., Chief Inspector of Mines in India.

4. The Committee will be designated 'The Indian Coalfields Committee' and will have its headquarters at Calcutta. It will assemble early in January 1946, and will submit its report to Government as soon as possible."

By a further Resolution No. Coal 119 (4), dated the 17th April, 1946, Rai Bahadur Lala Raj Kanwar, Chief Minister, Patna State (Eastern States Agency), was added as a Member of the Committee. We would emphasise that the Rai Bahadur, as also the rest of us, have been appointed on the Committee each in his personal capacity, and not as representing any particular interests in the coal industry.

Comments On The Terms Of Reference.

2. Subject to two comments which will appear later, this is the first time that a comprehensive economic survey of India's coal industry has been undertaken. The Committees appointed by the Government of India in the past were appointed for certain limited purposes and, though other matters were considered and reported upon by those Committees as incidental to their main terms of reference, the economic aspects of the industry have not so far received a close and detailed scrutiny. Until the recent war, the administrative needs of the industry have been considered only with reference to particular matters concerned primarily with production. The case for a unified administration, which will interest itself also in other aspects of the industry, such as research and the use and distribution of coal, has received little attention. That the moment is appropriate for a comprehensive enquiry is, we think, self-evident. The country is planning to embark on large schemes of industrial development and coal is so vital that an essential pre-requisite to sucess in these schemes is to examine the conditions of the coal industry and place it on a sound footing. Moreover the war just ended has given Government considerable insight into the problems of the industry and experience of administrative requirements. We are, to this extent, more favourably placed in determining what is necessary and also what is practicable.

The country generally, and the coal industry in particular, have recognised the importance of our enquiry and we have received abundant help and co-operation. It may even perhaps be said that the industry, with its background of instability between the two wars, feels the need of a sympathetic and comprehensive examination of its problems in order that the lack of understanding which characterised that period may be avoided in future.

3. The first limitation which, in our opinion, exists on the scope of the present enquiry is the exclusion of consideration of the technical problems of the industry. The re-organisation of the Indian coal industry and in particular the very considerable increase in production which seems necessary inevitably raise many technical issues and it may be that Government will, in the near future, find it necessary to appoint a technical Committe to make a proper investigation of these issues. In this category would fall

questions such as the opening of new collieries, the most suitable methods of working, including the question of mechanisation, the adequacy of lighting and ventilation arrangements in mines in view of their bearing on the output of coal per man shift, the suitability of the present Mining Regulations, etc. Some of these matters have, however, had to be dealt with by us but, from the nature of things, our recommendations can be broad indicators only towards further study.

We must also note here the apparent inconsistency in our terms of reference. By the first paragraph of these terms of reference, we are required to review the proposals made by previous Committees and to furnish appropriate recommendations. Many of these proposals are of a technical nature. It also appears quite impossible for us to consider, for example, the question of conservation of metallurgical coal without going into the technical aspects of utilisation. In the result, it will be found that we have dealt with a number of technical questions which are inevitably connected with other matters under enquiry, and in doing so we have drawn largely upon the knowledge and assistance of our Assessors.

4. Before we started our enquiries, we were informed by the Department of Supply that we were not to undertake any investigation of labour problems. The reason for this was stated to be that the Labour Department of the Government of India had appointed a Committee to make an *ad hoc* survey of labour conditions in coal mines with the object that this survey should be placed before the Social Security Planning Committee for consideration. We realise that the labour problems of the coal industry are capable of separate enquiry and consideration but feel, nevertheless, that, having regard to the over-riding importance of labour in the Indian coal industry, a composite view of future planning has been made more difficult by the exclusion of labour problems from the scope of our investigation. But certain labour questions, such as improvements in the output of Indian coal mining labour and their wages, are inextricably mingled with other important questions under our consideration and we have felt it our duty to deal with them, though of necessity in rather general terms. To this extent our recommendations on related matters are not as complete or final as we would have wished them to be. We have, however, since seen the report of this *ad hoc* survey and have, where necessary, taken it into account in reaching our conclusions.

Our Approach To The Enquiry.

5. Though the Committee was appointed in the beginning of December 1945, the majority of the members could be got together and the office of the Committee started only from the 1st of January, 1946. In the early stages, we had not the assistance of Mr. Ikramullah, who was then on deputation outside India on work connected with the United Nations Organisation and the Technical Committee of the International Labour Office on Coal Mining. Again, for nearly a month and a half from the middle of April, Mr. Neogy was lost to us in consequence of his selection by the economic and Social Council of the United Nations Organisation to represent India on one of its Commissions. It was also unfortunate that the appointment of Rai Bahadur Lala Raj Kanwar as a member of the Committee was notified by Government as late as April 1946. There was a further delaying factor. Some of us had made it clear to Government from the start that we would be unable to work whole-time on the Committee and would be compelled, periodically, to devote some time to other affairs. The Assessors, too, had their preoccupations. We have, there-

fore, been unable to function throughout as a Committee in continuous session.

6. We were convinced from the beginning of the need for taking the industry and the public into full confidence and, with this object, arrangements were made for giving wide publicity to the proposed enquiry and for eliciting preliminary public comment on the Committee's terms of reference. The principal Associations interested in the coal industry as well as a number of Chambers of Commerce, etc. were specially invited to furnish their views on the lines on which the enquiry should be undertaken. Much valuable material reached us as a result and helped in the drafting of our questionnaires.

We thought it would be advantageous to deal with the two paragraphs of the terms of reference in separate questionnaires. Questions arising out of the first paragraph were more or less of a factual character, whereas the second paragraph dealt with fundamental problems not previously considered at length. But there is some degree of over-lapping between the two paragraphs and when, therefore, we found that any of the recommendations of the previous Committees were connected with problems arising under the second paragraph, we dealt with them in our second questionnaire. The two questionnaires were issued on the 1st and the 15th February, 1946, respectively, but replies continued to be received long after the one month's period stipulated in each case. This was perhaps inevitable in respect of the second questionnaire which raised numerous and complicated issues, but the fact nevertheless caused considerable delay in our further enquiries and discussions. We sent copies of our questionnaires to 158 selected Associations, Chambers, individuals, etc. and received 89 replies to the first questionnaire and 79 to the second questionnaire. We also invited such of the General public as were interested in our enquiry to write and ask for copies. 56 requests were received and resulted in 8 and 13 replies to the first and second questionnaires respectively. In addition, 14 replies to each of the two questionnaires reached us without any prior reference from us.

It was only in the beginning of June that the Committee could start the recording of oral evidence for further elucidating various matters. In all, we examined orally 82 witnesses or groups of witnesses representing different bodies and this examination was concluded only on the 28th July 1946. We also had informal discussions with a number of people, including mining engineers, both Indian and British, in the coalfields, ropeway firms, Mr. J. Thomas of Messrs. Anderson Wright & Co., Mr. Wm. A. Haven, an expert on the steel industry, and the Governments of Assam and the Central Provinces.

There are two comments we wish to make regarding the oral examination of witnesses. The Government of Bihar, which have most important coal resources within their jurisdiction, felt unable to depute representatives as they considered any discussion useless in the context of the new constitutional proposals enunciated by the Cabinet Mission. The Central Provinces Government were still considering their mineral policy and asked for a postponement of our discussion with their representatives, but our official programme of work made this impossible. In another category was the relatively unsatisfactory representation of the Governments of Bengal and the Punjab, as the witnesses deputed for discussion were obviously not in a position to speak with any authority on most subjects. On the other hand, we had valuable discussions with representatives of the Governments of Assam and of H.E.H. the Nizam. The Baluchistan Administration also evinced great keenness in our enquiries. Representatives of the Industries & Supplies Department of the Central Government were unable

to meet the Committee, while the Labour Department sent in a written memorandum only. We wish to draw attention also to the hesitancy, not confined merely to the one Provincial Government but felt by many of the public also, created by the new constitutional proposals, but we have conducted our enquiry and framed our recommendations within the existing constitutional structure.

The interval between the issue of the two questionnaires and the receipt of the majority of the replies was utilised by the Committee in a tour of the principal coal-fields. Towards the end of February, 1946, we went on a short but instructive tour of the Jharia and Bokaro fields and saw, amongst other things, the desolation of the Jharia and Kari Jore fire areas. Later, in April, we undertook a more extensive tour of the Raniganj, Jharia, Central Provinces and Central India coalfields ; 23 collieries in all were visited. We also spent some time, on this occasion, in looking over the coke ovens, bye-product recovery plants and the iron and steel works of the Indian Iron & Steel Co., and the Tata Iron & Steel Co. In June we paid a short visit to Talcher and saw the three collieries there. During these tours, we had the benefit of most useful discussions with mining engineers and mine managers ; and it is pleasant to record that everywhere we were greeted warmly by the mining community. It is true that we have not visited some coalfields, but we were pressed for time and did not consider it essential to tour these fields, some of which had, in any case, been seen by some of us. Our visits to the coalfields were most helpful and have enabled us to appreciate more fully the problems requiring attention.

Plan Of The Report.

7. Normally, we would be expected to deal with the two paragraphs of our terms of reference separately. But mention has already been made of the close connection between the two paragraphs of the terms of reference in many matters and we felt, therefore, that to adopt the normal course would create a break in the continuity of and a defect of form in our report. In our opinion, advantage lies in dealing with connected problems at one place and, in doing so, we have, where necessary, reviewed the histroy of a problem, including the conclusions of previous Committees and the adequacy or otherwise of Governmental action and have then proceeded to make our recommendations on the problem as it exists today. For ease of reference, however, we attach as Appendix I a statement showing the principal recommendations of previous Committees and the action that was taken by Government thereon.

8. This briefly is the plan of our report. We state first the data from which our consideration of India's coal problems must start ; these include the country's coal resources, present and future anticipated requirements and the development of production and of related matters that have taken place hitherto. Then we define the problems that require solution in the fields of use, production and distribution and follow up with our recommendations in regard to each. Lastly, we deal with a number of miscellaneous problems of the industry and end up with a scheme for the administration of the industry in the light of our recommendations. Where necessary, we give at the end of a chapter the principal conclusions and recommendations in it and, as usual, we give also a summary of the main conclusions and recommendations in the final chapter. The written and oral replies received to the two questionnaires are given in the subsequent volumes, as also the considerable amount of other information collected from various sources.

9. In designing the plan of our report and in making our recommen-

dations, certain fundamental convictions have been our chief guide. We believe that no single commodity more significantly marks the industrial greatness of a nation than coal scientifically utilised. The coal industry assumes greater importance in the economy of India because of our limited resources and because also of the need for rapid industrialisation. Secondly, the peculiarly fluctuating character of the coal industry in the past has impressed us with the need for co-ordinated planning for the future as the sole means of successfully overcoming the disequilibrium between supply and demand which chronically affects the industry and which is likely to continue to do so in the absence of suitable correctives. Thirdly, as a pre-requisite to successful planning,we believe that there is not necessarily only one solution to a given set of facts. Moreover, what may appear to be eminently desirable may not prove to be immediately practicable and, so, on occasions, we have pointed out what appears to us to be the better way and yet recommended a course of action falling short of it. But this fact, in itself, calls for an intelligent and steady surveillance, meanwhile, over the metamorphoses of the industry, so that the ultimate end in view is realised as early as practicable. In framing our recommendations, we have recognised fully the need for fostering real efficiency and for exercising an adequate care over the industry's economic health as a means towards the country's enrichment. War introduces a singleness of purpose into economics that often fades away in peace-time ; we would fain see that singleness perpetuated.

Acknowledgements.

10. It was fortunate that the Government placed at our disposal the knowledge and experience of three of their senior officers, conversant with the varied problems of the coal industry both from the technical and the transport angles. Messrs. Harrison, Faruque and Kirby, who served as Assessors to the Committee, rendered most valuable assistance throughout our investigation. In our understanding of the technical aspects of a problem and later in the formulation of our concrete proposals, the Assessors' views were most helpful and we feel greatly indebted to them.

To our Secretary, **Mr. Nayak**, our special thanks are due. His diligence and unflagging energy were truly monumental. To the undoubted ability and talent he displayed in collating and marshalling the masses of information placed before us he added a welcome enthusiasm. In the drafting of our report his touch has been most intimate and knowledgeable.

A world of praise is also due to Mr. suri, the Assistant Secretary, for the excellent arrangements made for our tours, and to Mr. Nandy, our competent and tireless Supprintendent, and the rest of the staff for their cheerfull and willing assistance throughout a most strenuous period.

PART I
CHAPTER II
INDIA'S COAL RESOURCES

The Occurrence Of Coal.

The coal bearing strata of India have been classified by geologists under two main heads—the Gondwana (Permian) measures and the Tertiary measures. The principal workable coal deposits are found in the Gondwana series which occur in Bengal, Bihar, the Central Provinces, Orissa, Central India, Madras Province, the Hyderabad State and some of the Eastern States. Tertiary coal measures occur in Assam, the Punjab, Kahsmir, Baluchistan, North-West Frontier Province and Sind. Two tertiary lignite deposits of some importance are those found in Bikaner and in the South Arcot district of Madras Province.

2. The extent of the total area under which coal probably occurs is large; an[1] estimate made in 1873 suggests that the extent is roughly 35,000 sq. miles and thus fifth in order of extent of the world's deposits, and three times as large as the estimated area in Great Britain. This calculation, ignoring as it does important factors such as the thickness of the seams, the depth at which coal occurs or the possibility of winning the mineral in an area, is of academic interest only. Dr. Cyril Fox, referring to this estimate, remarked[2]:

> "though the existing spread of the Lower Gondwana rocks may be large, the extent of measures containing workable coal even to a depth of 2,000 feet is limited; and of this fraction the coal that might be exploitable is subject to further drawbacks diminishing still further the quantities likely to be won".

Speaking generally, the Gondwana measures occur down the valleys of certain rivers (the Wardha, the Godavari, the Mahanadi and the Damodar), or, in geological terms, in original fresh-water basins of restricted extent; these are—

(1) the Godavari-Wardha basin;
(2) the Satpura basin;
(3) the Mahanadi basin;
(4) the Chattisgarh-Rewa basin;
(5) the Son-Palamau basin;
(6) the Damodar basin; and
(7) the Eastern Himalaya.

3. The earliest systematic exploration of India's coal deposits was started in 1845 by Mr. D. H. Williams, the Geological Surveyor of the East India Company. The Survey was undertaken in the Raniganj field and the later study made in 1858-60 by Dr. W. T. Blanford added greatly to the knowledge of this coalfield. The next 20 years or so saw a further intensive study of the country's coalfields and a very full account was given in a treatise on the 'Economic Geology of India' published by Government in 1881. It is interesting to note here that[3] "the Geological Surevey of India had its origin in the desire of Government to have the coalfields of this country systematically investigated, and the work of the survey was for some time wholly devoted to this task. It was only after the principal coalfields had been mapped and described, or were well in hand that the general examination

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[1] Memoirs of the Geological Survey of India, Volume LIX, p. 39.
[2] *ibid*, p. 40.
[3] *ibid*, p. 5.

of the Geology of India was taken up ". A further special memoir[1] on the coalfields of India was produced 32 years later in 1913, but this was merely an attempt to re-state and bring up-to-date the information in the earlier treatise. It was not until 1924 that a decision was taken to re-survey the coalfields. Dr. Fox surveyed the Jharia field and the Pench Valley, the Kanhan and Tawa Valley coalfields in the Central Provinces. The Raniganj field was also surveyed and mapped and surveys were also undertaken of the Rajmahal hills and the Karanpura, Auranga and Hutar coalfields . Separate memoirs have been written for the Jharia,[2] the Raniganj[3], and the Karanpura [4] fields. The comprehensive memoir[5] prepared by Dr. Fox in 1932 in respect of the lower Gondwana coalfields, therefore, deals with the Jharia, Raniganj and Karanpura fields only in a general way. These memoirs constitute the more important publications of the Geological survey of India on the coal resources of the country ; as they embody the most up-to-date information available, it is not necessary to refer to the many earlier publications. It was fortunate for us that the geological Survey of India brought out in 1945 in their new series entitled " Bulletins of Economic Minerals " a monograph [6] dealing with coal. It has been very carefully compiled by Mr. E. R. Gee, Superintending Geologist, Geological Suvey of India, and we have made use of its contents frequently. No detailed survey has yet been made of the tertiary deposits of north-eastern and north-western India, though a certain amount of development has taken place under private initiative. The recent discovery of lignite deposits in the Madras Province has attracted some attention and exploration is proceeding.

4. We attach as Appendix II a statement showing the various coalfields of the country together with certain related information, such as the extent of the deposit, the quality of coal, etc., where these details are available, in the Memoirs of the Geological Survey of India. The most important resources now being exploited are the Raniganj field of Bengal, the Jharia, Bokaro, Karanpura and Giridih fields of Bihar, the deposits in the Rewa, Korea, Hyderabad and Talcher States, and the Pench and Kanhan Valley and Wardha Valley fields of the Central Provinces. Of the tertiary coal deposits, despite difficult conditions, appreciable development has taken place in Assam and in the Punjab ; and the coalfields of Baluchistan have received a fillip during war-time. Elsewhere, exploitation has been hindered by natural obstacles and the absence of proper communications.

Geological Survey Of India Estimates Of Reserves.

5. An estimate of total reserves of coal in the *Gondwana* measures was attempted by Dr. Fox in 1932. On the basis of data, some of which were of an uncertain nature, he calculated[7] that the total reserves up to a depth of 1,000 feet would be about 60,000 million tons, as follows :—

	Million tons
1. Darjeeling and Eeastern Himalayan Region . . .	100
2. Giridih, Deogarh and Rajmahal hills	250
3. Raniganj, Jharia, Bokaro and the Karanpura fields .	25,650
4. Son Valley—Auranga to Umaria and Sohagpur . .	10,000
5. Chhattisgarh and Mahanadi (Talcher)	5,000
6. Satpura region—Mohpani to Kanhan and Pench Valley ..	1,000
7. Wardha-Godavari-Warora to Bedadanuru . . .	18,000
Total .	60,000

[1] Memoirs of the Geological Survey of India, Volume XLI (1913).
[2] " " " " LVI
[3] " " " " LXI
[4] " " " " LII, Part I.
[5] " " " " LIX
[6] Bulletin No. 16, Records of the Geological Survey of India, Vol. LXXVI.
[7] Memoirs of the Geological Survey of India, Volume LIX, p. 343.

Coal of all qualities occurring in seams of 1 foot or more in thickness is included in this estimate. Dr. Fox then went on to estimate the reserves of workable coal, by which term he meant coal averaging 25 per cent. of ash on a moisture-free basis and occurring in seams over 4 feet in thickness and lying within 1,000 feet of the surface. The figures he arrived at are given below[1] :—

	Million tons
1. Darjeeling foothills Lisu-Ramthi area	20
2. Giridih, Jainti and Rajmahal Hills	80
3. Raniganj, Jharia, Bokaro and Karanpura fields	10,150
4. Son Valley—Hutar to Umaria and Sohagpur	2,000
5. Chhattisgarh and Mahanadi (Talcher)	1,200
6. Satpura region—Mohpani to Kanhan and Pench	150
7. Wardha-Godavari-Warora to beyond Singareni	6,400
Total	20,000

Dr. Fox thought that the estimates for the Rajmahal hills and the Satpura regions were probably low and that those for the Wardha-Godavari valley far too high. He then proceeded to make an estimate of the reserves of good quality coal. Good quality coal was defined by him as coal averaging 16 percent. of ash on a moisture-free basis and occurring in seams of 4 feet thickness and over up to a depth of 2,000 feet. The total estimate of such coal was 5,000 million tons[2] distributed as follows :—

	Million tons
1. Giridih and Jainti	40
2. Raniganj	1,800
3. Jharia	1,250
4. Bokaro	800
5. Karanpura (North and South)	750
6. Hutar, Johilla, Burhar	50
7. Kurasia, Jhilmili, etc.	30
8. Talcher to Korba	200
9. Mohpani, Kanhan-Pench	30
10. Ballarpur-Singareni	50
Total	5,000

Dr. Fox also made an estimate of the reserves of good coking coal, *i.e.*, coal which, when subjected to destructive distillation, yields a hard coke suitable for iron ore smelting in blast furnaces. The chief characteristics of such coal were assumed to be a low ash content (under 21 per cent.), fine porous texture and strength (hardness and toughness) to resist pressure. On this basis, his estimate of good coking coal reserves was as follows[3] :—

	Million tons
1. Giridih	30
2. Raniganj	250
3. Jharia	900
4. Bokaro	320
5. Karanpura	not estimated
Total	1,500

6. In view of the importance of the Jharia and Raniganj fields, we reproduce below further details, given in Geological Survey of India Memoirs, of the reserves of coal in these fields.

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[1] Memoirs of the Geological Survey of India— Volume LIX, p. 344.
[2] „ „ „ „ „ p. 345.
[3] „ „ „ „ „ p. 345.

Jharia Field

For the purpose of calculating reserves, Dr. Fox adopted a rough system of classification of the Jharia seams according to quality and the result is given in the following table[1] which also indicates the reserves in 1930 in the various seams or groups of seams :—

	Name of seam	Classification	Reserves in 1930 upto 500 ft.	upto 1000 ft.	upto 2000 ft.
			(in million tons)		
Raniganj series (high volatile coal)	Lohpiti	Grade III	17	29	29
	Pathargaria	Grade III			
	Koradih	Grade II			
	Bharungia	except bottom			
	Hatudih	seam which is	36	61	61
	Bamangora	Grade I			
Barakar series (low volatile coal).	16 to 18	Grade I	115	225	225
	13 to 15	Grade I	293	568	731
	8 to 12	Grade II except 12 which is Grade I.	580	1,100	1,550
	1 to 7	Grade III	630	1,103	1,575
Extras			36	36	36
			1,707	3,122	4,207

The reserves of all good quality coal up to a depth of 2,000 feet are stated[2] to be 1,250 million tons only. As regards coking coal of good quality, *i.e.*, the coal comprised in seams 13, 14, 14A and 15 to 18, the reserves in 1930 were[3]—

	Million tons.
up to 500 ft. depth	408
up to 1,000 ft. depth	793
up to 2,000 ft. depth	956

There seems to be a small error in these figures, since the estimated reserves in seam 12, which is stated to be of Grade I quality, have not been included. The rest of the coal in the Barakar series (which is also practically all coking or semi-coking coal), *viz.*, 3,125 million tons up to a depth of 2,000 feet is medium to low grade.

The high volatile coal in the Raniganj series of the Jharia field is mostly non-coking.

The extraction in the Jharia field from 1931 to 1945 is estimated to be 153 million tons and on the basis of figures given by the Coal Mining Committee, 1937, of extraction from 1928 to 1936, and of our knowledge of mining history in the thirties, it would be safe to assume that nearly 80 per cent. of this represented good coal. The percentage of extraction in this field has generally been lower than in the Raniganj field and losses of coal on account of fires and collapses have been considerable. Assuming an average extraction over the period of 60 per cent. and including the very considerable destruction in fires, we could probably say that the coal exploited or lost in the Jharia field from 1931 is about 300 million tons, of which 75 per cent. is likely to be good coal, mostly coking. The reserves of good coking coal up to a depth of 2,000 feet are, therefore, now likely to be in the neighbourhood

[1] Memoirs of the Geological Survey of India, Volume LVI, p. 253.
[2] cf. para. 5 above.
[3] Memoirs of the Geological Survey of India, Volume LVI. P.254.

of 730 million tons, and of all good quality coal about 1,025 million tons; further, the total reserves of 4,207 million tons in 1930 would now be reduced to 3,907 million tons.

Raniganj Field

The reserves in this case have been classified under the following categories :—

(*i*) Coking coal of superior quality,

(*ii*) Non-coking coal of superior quality,

(*iii*) Coal of inferior quality.

Under (*i*) have been included those seams, or portions of seams, the coal in which has been proved, either alone or in admixture with a strongly coking coal, to yield a hard coke suitable for metallurgical use. Under (*ii*) are included the seams clas sified as Selected Grade or Grade I by the Indian Coal Grading Board; the remainder comes under (*iii*).

Classified as above, the reserves were stated to be as follows in 1931[1] —

Coking coal of superior quality

Name of seam	Original quantity (expressed in tons) up to 1,000 ft.	Original quantity (expressed in tons) up to 2,000 ft.
Ramnagar	12,066,000	22,227,000
Laikdih	18,343,000	31,298,000
Begunia	12,193,000	26,672,000
Sanctoria	13,336,000	13,336,000
Dishergarh	106,853,000	237,372,000
Original total	162,791,000	330,905,000
Amount already exploited up to 1931[2]	81,000,000	81,000,000
Reserves in 1931	81,791,000	249,905,000

Non-coking coal of superior quality

Name of seam	Original quantity (expressed in tons) up to 1,000 ft.	Original quantity (expressed in tons) up to 2,000 ft.
Damagaria-Salanpur 'A'	62,006,000	99,156,000
Gourangdi-Kasta	24,475,000	43,020,000
Shampur '5'—Laikdih-Bahira 3	43,156,000	113,736,000
Top Fotka-Chanch-Begunia	27,294,000	57,078,000
Sanctoria-Poniati	170,335,000	324,379,000
Dishergarh	29,060,000	152,170,000
Samla	131,582,000	131,582,000
Raghunathbati	8,764,000	8,764,000
Jambad-Bowlah	132,090,000	132,090,000
Nega-Raniganj-Lower Kajora	261,766,000	307,490,000
Ghusick-Siarsol-Upper Kajora	172,225,000	300,374,000
Satpukhuriya	8,891,000	8,891,000
Original total	1,071,644,000	1,678,730,000
Amount already exploited upto 1931[2]	108,000,000	108,000,000
Reserves in 1931	963,644,000	1,570,730,000

[1] Memoirs of the Geological Survey of India, Volume LXI, pages 284 and 285.

[2] It is curious that the amounts exploited to depths of 1000 ft. and 2000 ft. are shown to be the same: One inference would be that there were no workings below 1,000 ft. but it is possible also that the same figure has been given in the absence of more detailed information.

Coal of inferior quality

	Original quantity (expressed in tons) up to	
	1,000 ft.	2,000 ft.
Original total	4,712,142,000	6,940,291,000
Amount already exploited up to 1931[1] . .	81,000,000	81,000,000
Reserves in 1931	4,631,142,000	6,859,291,000

It must be stated of the first table that only the coal in the Ramnagar and a portion of the Laikdih seams is strictly good coking coal, *i.e.*, coal that is suitable by itself for the manufacture of metallurgical coke. The coal from the other seams can be used for this purpose only in admixture with good coking coal.

On this basis, we have attempted a further classification of the original Raniganj field reserves (up to a depth of 2,000 ft.) under the categories :

(*a*) Coking coal of superior quality
(*b*) Superior quality high volatile coal
(*c*) Superior quality low volatile coal
(*d*) Inferior coal (both high and low volatile).

(*b*) and (*c*) have been worked out on the assumption that, as a rule, coal in the Raniganj series is high volatile and in the Barakar series low volatile. The result is as follows :—

	Original estimated reserves Tons
Coking coal of superior quality	53,525,000
Superior quality high volatile coal	1,616,448,000
Superior quality low volatile coal	339,662,000
Inferior coal	6,859,291,000

Writing in 1932, Mr. Gee stated that deductions of 189 million tons in the case of the coking and other superior coals, and 81 million tons in the case of the inferior coal, must be made to allow for extraction and losses up till 1931 ; it is, of course, not possible to sub-divide the 189 million tons exactly amongst the three classes mentioned above. The coal extracted from 1932 to 1945 is about 109 million tons. Most of this was of good quality. The Coal Mining Committee, 1937, in dealing with the years 1928 to 1936, stated[2] that the output of good quality coal (Selected and 1st Grade)[3] was over 92% of the total in the Raniganj field. Assuming the average

[1] It is curious that the amounts exploited to depths of 1,000 ft. and 2,000 ft. are shown to be the same. One inference would be that there were no workings below 1000 ft. but it is possible also that the same figure has been given in the absence of more detailed information.

[2] Report of the Coal Mining Committee, 1937, para. 88.

[3] Indian Coal Grading Board classification.

extraction for the period to be 66⅔%— the figure was stated to be much lower for the first half of the 1930s but has improved lately—and allowing for other minor losses, the total original reserves must have been further depleted since 1932 by about 175 million tons in this field. The total reserves of superior quality coal (up to 2,000 ft.) now probably stand at approximately 1,660 million tons, as follows :

	Million tons
Original reserves	2,010
Amount exploited up to 1931	189
Amount exploited since 1932 (assuming that good coal constitutes 92·5 % of the total) $\frac{175 \times 92 \cdot 5}{100}$ *i.e.*	162
Total exploited	351
Balance	1,660 (approximately)

Making a *pro rata* reduction in respect of the reserves of coking coal of superior quality, we get a reserve of about 42 million tons.

7. The position regarding coking coal, as disclosed above, deserves summarising. The reserves in the Jharia field appear to be about 730 million tons and those in the Raniganj field 42 million tons, *i.e.*, a total of 772 million tons.

8. The Coal Mining Committee, 1937, brought Dr. Fox's figure of 5,000 million tons of good quality coal up-to-date on the basis of subsequent production and the result is given in the following table[1] :—

Area	All good quality coal (in million tons)	Good quality coking coal (in million tons)
Giridih and Jainti	22	21·3
Raniganj	1,763·6	230·4
Jharia	1,209·5	859·5
Bokaro	795	315
Karanpura (North and South)	749	..
Hutar, Johilla, Burhar	50	..
Kurasia, Jhilmili etc.	27	..
Talcher to Korba	198	..
Mohpani, Kanhan, Pench	30	..
Ballarpur, Singareni	45	..
Total	4,889·1	1,426·2

Allowing for the production of recent years, the reserves at the end of 1944 were placed[2] by Mr. Gee at 4,520 million tons of good quality coal of which about 1,185 million tons are of strongly coking quality.

Some later information about two coal deposits in the Gondwana series has come into our possession and is reproduced below :—

Kamptee field (Central Provinces)

A twenty-foot seam of coal, shaly coal and shale, including 10 to 12 ft. of coal of fair quality, has been proved in the East Tekari area over a distance of about 1 mile along the strike and 500 ft. to the dip. Workable sections of this seam exist within a depth of 100 ft. and the total proved

[1] Report of the Coal Mining Committee 1937, paras. 122 & 124.
[2] Bulletin No. 16, Records of the Geological Survey of Iddia, Vol. LXXVI, p63

reserves amount to about 1 million tons of coal. Further exploration in the East Tekari area is, however, obviously necessary in view of the possibility that the coal seam may continue regularly in depth southwards to the Kanhan river ; in that event, the reserves of coal might be considerably larger, possibly of the order of 17·5 million tons, it is stated. An analysis of the coal found is given below :—

Moisture	7·84%
Ash	22·72%
Volatile matter	30·9 %
Fixed carbon	38·53%
Calorific value	9140 B.T.U

Surguja coalfields.

The estimated extent of the deposits is about 800 sq. miles, of which only about 165 sq. miles have been explored and about 80 sq. miles prospected ; no estimate of the reserves is available. The quality of the coal is stated to be first grade steam and it has been suggested that some of the coal may be coking, but of this we have received no evidence. A typical analysis of the coal found is as follows :—

Moisture	2·4%
Ash	12·9%
Volatile matter	32·9%
Fixed carbon	54·4%
Sulphur	6·9%
Phosphorus	·077%
Calorific value	11176B.T.U.

9. As regards tertiary coal deposits, an estimate by Dr. Fox in 1929 gave [1] the following figures :—

	Million tons
Coalfields of Upper Assam	1,000
Coalfields of Garo-Khasi Hills	1,000
Coal fields of North West India (Punjab, North West Frontier Province, Baluchistan and Rajputana)	300
Total	2,300

In addition reserves probably totalling several hundred million tons seem likely in the recently discovered lignite deposits in the Madras Province Some information about these and also in respect of the Bikaner deposits, which have recently been more thoroughly studied, are given below :—

Cuddalore deposits

Recently important deposits of lignite from 20 to 70 feet in thickness have been discovered, according to Mr. Gee[2]; within the Cuddalore sand stones of the Cuddalore area, South Arcot District, Madras Province. Reserves totalling at least several hundred million tons appear probable.

Bikaner deposits

The lignite occurs over an area of 8,000 ft. by 1,700 ft. in a seam with an average thickness of 20 ft. ; the reserves are estimated at about 10 million tons. Analysis of a moisture-free sample yielded the following results :—

Carbon	67·37%
Hydrogen	5·03%
Nitrogen	·9 %
Sulphur (volatile)	2·24%
Ash	8·1 %
Oxygen	16·3 %

[1] "Review of the Mineral Industries of India and Burma during 1939" by Dr. C.S. Fox, also quoted in Bulletin No. 16, Bulletins of Economic Minerals, Records of the Geological Survey of India, Volume LXXVI, page 63.

[2] Bulletin No 16, Records of the Geological Survey of India, Vol, LXXVI page 30, footnote 1

10. In his oral evidence before us, Dr. Fox explained that the basic assumptions in his estimates were :

(*i*) as regards inferior coals, *i.e.*, coals containing ash in excess of 25% it would be uneconomic to work beyond a depth of 1,000 ft. ; and

(*ii*) as regards good quality coal, seams under 4 ft. in thickness and all seams at depths below 2,000 ft. may be ignored for all practical purposes.

With reference to (*i*) above, Dr. Fox, making a rough guess, stated that, if ignoring economic considerations, coal up to a depth of 2,000 ft. occurring in seams of 4 ft. in thickness were to be estimated, the total reserves might be of the order of 40,000 million tons. With regard to the good quality coals referred to in (*ii*) above, Dr. Fox stated that the reason for his estimating up to a depth of 2,000 ft. only was that the seams are usually found burnt as one goes deeper. It is only the upper seams in the Gondwana measures that are found comparatively intact ; even the middle seams are frequently found severely burnt and destruction is certain to be greater at greater depths. Dr. Fox was aware that in one colliery in the Raniganj field workings had gone below the 2,000 ft. level, but he would not change his general view that very little good quality coal is likely to be found at such depths.

11. We had occasion to discuss with Dr. H. Crookshank, Superintending Geologist of the Geological Survey of India, the question of the basis on which estimates of coal reserves should be made and the following questions and answers taken from his evidence are of interest :—

" *Question.*—We should like to know whether we are to confine our estimates to coal measures up to 2,000 ft. or we should go down below that and include that coal in our estimates ?

Answer.—I think you ought to go further, because the custom in all mineral industries is to begin at the surface and, as the prices rise, go deeper. In Europe, they have certainly gone up to 5,000 ft. Therefore, I cannot see why it should be imposible in a thick seam of good coking coal to go down to 4,000 ft. in India.

* * * * * *

Question.—We have been told that if you go down very deep, there is a likelihood that the seam will be found burnt. What have you to say as regards this ?

Answer.—I do not think there is any particular reason for igneous intrusions or burnt strata as one goes deeper ".

Judging by what is already being done, we have no doubt that workings at depths below 2,000 ft. are perfectly possible to expert mining practice in India. It will be necessary, therefore, to attempt an estimate of India's reserves of workable coal and of good quality coal at depths below 2,000 ft. also.

12. There is one further comment we wish to make in regard to the estimates of the reserves made by the Geological Survey of India. They were admittedly based on uncertain data and it was anticipated that further prospecting would, in all probability, disclose larger reserves. How much the discrepancy can be has been demonstrated by some of our own enquiries in this matter.

Our Estimate of Reserves.

13. Many countries have long realised the need for reliable figures of their coal resources and, over a period of years, have taken vigorous steps to prove their extent. Coal, as we have said, is the backbone of industry; but, barring the estimate of the Geological Survey of India with which we have dealt no attempt has been made to arrive at reliable figures of the country's coal resources. After a full consideration of the estimates hitherto made, we therefore decided to make a more direct approach to the problem and, accordingly, issued the following queries to all collieries in British India and the Indian States:

"What are the reserves of workable coal at collieries and in areas under your control?

(*a*) in each seam

(*i*) as at present being worked, and

(*ii*) if the full section of the seam is worked, and

(*b*) in virgin seams which have been proved and are thought to be workable?"

Having regard to the vital importance of the information sought, it is regrettable that a large number of collieries have not sent in their replies, as will appear from the following table:—

Province or State	No. of collieries addressed	No. of replies received
Bihar	594	278
Bengal	216	116
Central Provinces	41	26
Assam	9	6
Orissa	2	1
Punjab	65	29
Baluchistan	43	7
Sind	3	—
Indian States	16	16

The meagre response from the Punjab and Baluchistan is not surprising as many collieries in these areas work intermittently. What we had hoped for was a fuller response from Bengal and Bihar in view of their importance in the Indian coal industry. Our effort has failed to secure its objective but there is much of value and interest in what we have gleaned. It is also satisfactory that the majority of the larger undertakings have responded fully to our enquiry.

14. The result of our enquiries, for what it is worth, is embodied in two statements attached as Appendices III and IV. Appendix III is a statement of the reserves in the various seams of each coalfields shown district by district. Appendix IV is an abstract of the same statement showing the total reserves in each coalfield, again, by districts. A third statement

showing the reserves, as reported to us, in each Province and in the Indian States taken as a whole is reproduced below for ease of reference :

Estimated Reserves of Workable Coal in Provinces and States.

Province	As at Present worked	If full seam is worked (excluding figures in previous column)	Virgin seams and areas proved and thought workable	Total
	(Tons)	(Tons)	(Tons)	(Tons)
Bihar . . .	1,855,543,894	460,167,557	10,830,570,751	13,146,282,202
Bengal . . .	440,601,201	248,296,291	1,663,467,500	2,352,364,792
Central Provinces .	302,005,039	24,310,062	55,486,350	381,801,451
Assam . . .	5,870,200	144,000	8,233,920	14,248,120
Orissa . . .	1,300,000	...	5,600,000	6,900,000
Punjab . . .	487,000	37,000	1,397,000	1,921,000
Baluchistan . .	6,073,999	...	..	6,073,999
States . . .	387,293,568	70,016,561	117,501,240	574,811,369
Grand Total . . .	2,999,174,901	802,971,471	12,682,256,561	16,484,402,933

The following are the salient points of these statements :—

(*i*) The reserves of coal in seams as now being worked are very nearly 3,000 million tons ;

(*ii*) An additional 800 million tons of coal exist in the same seams and could be won if the full seam, as against sections of it only, is worked ; and

(*iii*) The reserves in virgin, or rather hitherto unworked seams or areas, proved and thought to be workable, are said to be in the neighbourhood of 13,000 million tons.

(*iv*) The reserves in the Karanpura field, even after allowing for a very large portion which is still only partially proved, are undoubtedly much larger than had ever been anticipated. Much of this coal, too, is stated to be of good to medium quality and our total reserves of good coal, therefore, increase very considerably. The pre-eminent position of the Bengal-Bihar fields remains unimpaired ; if anything, they gain further in importance.

(*v*) The deposits of Central India and of the Central Provinces have also a very real significance in the Indian coal situation ; and in noting the reserves of these areas, it must be remembered that prospecting in many parts is still only in its infancy.

The estimate of total reserves on the basis of replies received is nearly 16,500 million tons.

Reserves of Different Classes of Coal.

15. For practical purposes Indian coals can be sub-divided into the following classes :

(*i*) Coal suitable for metallurgical purposes, including not only good coking coal which can be used straightaway for the manufacture of metallurgical coke, but also coal which can be used in admixture with good coking coal or which on washing yields a product that can be used either by itself or in admixture for the manufacture of metallurgical coke. So far as is known, such coal is found only in the Jharia, Raniganj, Bokaro and Giridih fields.

(*ii*) High grade steam coal, including both high volatile and low volatile coal, the principal sources of which are the Raniganj, Bokaro, Karanpura, Talcher, Central India, Central Provinces and Singareni fields.

(*iii*) Low grade steam coal.

(*iv*) Tertiary coals.

(*v*) Lignites.

We have adopted this classification principally for the purpose of making estimates, necessarily approximate, of the reserves to be found in India in certain categories. But even a resonable degree of accuracy in this matter can be achieved only after a more complete survey and analysis have been made of Indian coals. This is particularly the case in respect of coals considered suitable for metallurgical purposes; the classification of a coal as suitable for washing or for blending can obviously be done with confidence only after the coal is analysed properly and has been experimented upon both in the laboratory and in a pilot plant. The need for research on the quality of Indian coals has been apparent at almost every step of our enquiry and we shall deal with it more comprehensively at a later stage. For the present, the matter has been mentioned only so as not to create any misunderstanding regarding our attempt to classify the reserves of Indian coals, so far as may be possible, under certain classes.

16. Coal suitable for metallurgical purposes may be taken first. The Coal Mining Committee, 1937, estimated the reserves of good coking coal at the end of 1936 to be 1,426 million tons. Bringing the figures up-to-date to the end of 1944, Mr. Gee put the total reserves at 1,185 million tons. But we have pointed out in an earlier paragraph that not all the coal in the Raniganj field which Dr. Fox classified as coking coal is capable of being used by itself for the manufacture of metallurgical coke; only the Ramnager seam and a portion of the Laikdih seam contain such coal. Again, the major portion of the coal in the Bokaro field is not good coking coal; it is suitable for use only in admixture with other good coking coal and has, in recent years, been so used in small quantities. We are advised that good coking coal can be strictly said to occur only in seams 12 to 18 of the Jharia field, in the Giridh field and in the Ramnager seam and in a portion of Laikdih seam of the Raniganj field; but the Giridih field is nearing exhaustion and may be left out of consideration. We have shown earlier that the present reserves in seams 13 to 18 of the Jharia field are probably in the neighbourhood of 730 million tons. The reserves in seam,12 have not been readily available from the Geological Survey of India's Memoirs, but the details we have collected give a figure of 167 million tons. The total for seams 12 to 18 may, therefore, be put in the neighbourhood of 900 million tons. But there is an important reservation to be made in regard to this total. The Jharia seams mentioned are not of uniform quality throughout; from Katrasgarh westwards, quality definitely deteriorates and it would be most unsafe to treat all the 900 million tons of coal in these seams as good coking coal. What proportion of the total cannot be so classified it is difficult to say; but it is probably appreciable. As regards the Ramnagar and Laikdih seams of the Raniganj field, we have estimated the present reserves at about 42 million tons. The total reserves of good coking coal are, therefore, undoubtedly much below 1,000 million tons, and may well be in the neighbourhood of about 700 to 750 million tons only, after allowing for the inferior coal in certain parts of seams 12 to 18 of the Jharia field.

17. If we were to rely on the figures reported to us by the collieries, we would have to revise our estimates of the reserves of good coking coal. We have been told that such coal is found in the following seams :

12, 12A*, 13, 13A, 13B, 14, 14A, 15, 15A*, 16, 16A, 17, 17A, 17B, 18, 18A*, in the Jharia field and the Ramnagar and Laikdih seams of the Raniganj field.

The total reserves in these seams, as reported to us, are as follows :

	Million tons
Reserves in seams as now being worked	597
Additional reserves if the full seams are worked	242
Reserves in virgin areas proved and thought workable	310
	1,149

On this basis, the reserves appear to be much larger, but there is again an important reservation to be made. We have classified the collieries which have reported reserves to us in the Jharia field according to the quality of the coal as determined by the Indian Coal Grading Board and we find that many of the reporting collieries have resources of inferior grade coal only which cannot obviously be described as good coking coal, even though it comes from seams 12 to 18. The total is, therefore, not a safe guide to the country's reserves of good coking coal.

18. Yet another approach to this poblem was made. The office of the Coal Commissioner prepared for us a list of collieries which are now despatching coal to iron and steel works and another list of collieries which are not so despatching coal but whose output is considered by that office to be suitable for use by iron and steel works. For obvious reasons, we have refrained from publishing these lists ; but following them, and on the basis of the reserves reported to us, we attempted to work out the total reserves in these collieries, classifying the reserves also by grades. Due, however, to the incompleteness of the replies received, the result we arrived at loses some of its value. Here, too, we must point out that the collieries listed by the Coal Commissioner do not all produce good coking coal ; some, again, of the despatches are of the steam and gas coals required by iron and steel works for purposes other than use in coke oven batteries. These qualifications, in turn, detract somewhat from the value of the totals obtained, but the figures are nevertheless given below. Though they may not represent the reserves of good coking coal, they probably constitute the bulk of the coal which can be used for metallurgical purposes, by itself or in blending or after washing.

	†Selected Grade A (million tons)	†Selected Grade B (million tons)	†Grade I and below (million tons)
Reserves in collieries which have been despatching coal to iron and steel works.	373	421	99
Reserves in collieries coal from which can be used by iron and steel works.	49	182	226
Total	422	603	325

The grand total is 1,350 million tons, including 325 million tons of coal of Grade I and below.

* As described by colliery owners.

†Classification under the Colliery Control Order, 1944.

19. From a consideration of all available data and after a thorough discussion, we are inclined to think, to be on the safe side, that the reserves of good coking coal may not exceed 700 to 750 million tons at the present time. It is probable, too, that recent output of this type of coal has been about 8 million tons per annum ; on that basis, and allowing for losses in and during production, the life of the reserves would be about 65 years.

We thus arrive at a result more or less in accord with previous official opinion on this subject. We do not claim that this necessarily demonstrates the soundness of our approach or the correctness of the Geological Survey of India's estimates. Doubts in this matter can be set at rest only after a detailed survey of the coalfields, undertaken alongside a chemical and physical analysis of coal. Our reserves of good quality coking and other coals have a very real significance to the future of industry and we would, therefore, emphasise again the great importance of undertaking and completing this task quickly.

20. Turning to high grade steam coal, it will be recalled that the Geological Survey estimated the original reserves of good quality coal other than coking coal at 3,500 million tons. Bringing this figure up-to-date to the end of 1944, Mr. Gee placed the total at 3,335 million tons. Of the original total of 3,500 million tons, the reserves of superior quality coal in the Raniganj field were placed at 1,679 million tons by Mr. Gee, but we have shown in an earlier paragraph[1] that the reserves of low volatile and high volatile coals in this field should be taken to be 1,616 million and 340 million tons respectively. If the 351 million tons lost through exploitation are distributed proportionately over these two categories the present reserves would be approximately—

	Million tons
Low volatile high grade coal	279
High volatile high grade coal	1,326

The other high grade non-coking coal occurs principally in the Talcher field and in parts of the Central India and Central Provinces coalfields and in the Singareni coalfields ; also in the Karanpura and Bokaro fields. Much of the coal in Talcher, Central India, Central Provinces and Hyderabad State fields is high volatile coal. Total reserves of good quality coal in these areas have been placed[2] at 350 million tons at the end of 1936 by the Coal Mining Committee, 1937, but the figures compiled by us show the total reserves to be nearly 1,900 million tons ; not all of this, however, is necessarily high grade coal.

21. The reserves of low grade steam coal are very large and were described by the Coal Mining Committee, 1937, to be " practically unlimited ". We share this view and do not consider it necessary to go into this question at any length.

22. A brief reference may be made to the tertiary coal of Assam. This is good coal and much of it would be suitable for metallurgical use but for one defect, namely, a high sulphur content which makes it unsuitable for metallurgical use. The reserves are large. If the progress of science discloses an effective method of desulphurisation, Assam coal will become a potential addition to our reserves of good coking coal. The work is obviously one of importance and should be undertaken as soon as possible by the Fuel

1 Para. 6 above.

2 Report of the Coal Mining Committee, 1937, para. 122.

Research Institute of India. The process for desulphurisation will also benefit the Punjab and Baluchistan coals, though, of course, these are not suitable for metallurgical purposes. Even so, desulphurisation must add greatly to their economic value.

Conclusions And Recommendations

(1) The assumption by the Geological Survey of India that in estimating the reserves of good quality coal all seams at depths below 2,000 ft. may be ignored does not seem justified and **it is necessary to attempt an estimate of the reserves at depths below 2,000 ft. when more data are available.**

(2) The known reserves of good coking coal in the country may not exceed 700 to 750 million tons and, at the present rate of output, they will be exhausted in about 65 years. The country cannot, therefore, afford to be complacent over its reserves of good coking coal.

(3) There is no reason for anxiety over the resources of good quality non-coking coals, both high and low volatile, or of low grade coals.

(4) **A work of importance for the Fuel Research Institute is to attempt to devise a process for desulphurising the high sulphur, but otherwise excellent, coking coals of Assam.**

CHAPTER III
COAL RAISINGS AND CONSUMPTION

Early History Of Coal Mining In India.

Having surveyed the coal resources of India, we now turn to a consideration of the manner in which they have been developed. This would include a review of the progress of production and the interplay of supply and demand in the coal industry. For all practical purposes, it is the history of the years from 1920 that need engage our attention, for it is only since then that the industry has been exposed to growing pains, and it is from history of these years that we must draw our lessons for future planning. But for the sake of completeness we start with a brief reference to the pre-1920 era.

2. There is evidence in India's archæological relics to suggest strongly the inference that coal was being utilised in the more remote periods of the country's history, but the first published reference to the mining of coal dates back to the year 1774 when shallow mines are reported to have been developed in the Raniganj field. In the face of many vicissitudes, however, the venture apparently ended in failure. We then go forward 40 years to the next attempt at coal-mining, but it is only in the second quarter of the 19th century that a number of seams were opened in the Raniganj field, either as quarry workings or shallow pits. This advance was, in part at least, facilitated by the systematic geological survey of the field that was undertaken in 1845-46 and again in 1858-60 and we find that by 1860 nearly 50 collieries were producing about 282,000 tons of coal per annum in the Raniganj area. A notable feature of this development was the failure of Government to assert their rights to the mineral wealth in the permanently settled areas. The early entrepreneurs had, therefore, to conclude agreements with the local landowners and the inevitable complexities and resultant expensive legal disputes caused many failures.

During the 19th century, the Raniganj field was the most important producer of coal in India ; out of a total Indian production of 6·12 million tons in 1900, the field raised 2·55 million tons. The importance of the Jharia field was, however, becoming increasingly apparent by the end of the century and with the development of additional railway facilities, the output of the field grew rapidly and by 1906 exceeded that of the Raniganj field.

Elsewhere progress had been continuous during the second half of the 19th century. The beginning of coal mining in the Central Provinces dates from the year 1862 and in the Rewa State from 1884. The Singareni field in the Hyderabad State had been discovered in 1872 and went into production some 15 years later. Appreciable developments also took place in Upper Assam from 1881 and in Baluchistan and in the Punjab in the last decade of the 19th century.

3. At the beginning of the present century, coal production in India had reached a total of about 6 million tons, of which nearly 5 million tons were obtained from the Raniganj, Jharia and Giridih fields. Further progress was made during the years preceding the first world war and a number of new fields (*e.g.*, Bokaro, Pench Valley and Chanda Valley) were opened, so that by 1914 the total Indian output had risen to nearly 16·5 million tons per annum. The Jharia and Raniganj fields, with outputs of 9 million tons and nearly 6 million tons respectively, however, continued to dominate the scene. In this period of rapid growth, by far the greater portion of the output was used for steam raising by the railways and industry. But the development of the Jharia field, with its rich coking coal, may have provided

some encouragement to the iron industry. The establishment of the Tata Iron & Steel Co. at Jamshedpur in 1911 was a very important step towards a proper utilisation of the coking coal of Jharia.

4. The increased demands for coal during the 1914-18 war gave a further impetus to the coal industry. There was a considerable increase in industrial activity throughout the country and the requirements of the railways and, in the early years, coal exports also increased appreciably. By the end of the war, the output had increased to nearly 21 million tons per annum, of which the share of the Jharia and Raniganj fields was about 14 million tons and 6½ million tons respectively.

Coal Production From 1920 To 1945.

5. Appendix V is a statement showing the raisings of coal in British Indian Provinces and in Indian States during the years 1920 to 1945. These years fall naturally into five groups.

6. The period from 1920 to 1926 saw a most serious decline from the war-time prosperity of the industry. The output in 1920 fell by nearly 3 million tons as compared with the previous year and though there was an increase in the subsequent years and an overall gain during the years 1924-26, the end of the period saw coal raisings almost where they were at the close of the war. The reasons for this depression were many. To meet the high post-war demand, a number of workings into seams, which had been ignored as being of no commercial value, had been opened. With the return of normal conditions, these would, in any case, have had to close down. Their existence, and indeed the increase in their number, at the time of the abnormal trade depression of 1920-21 affected the industry very seriously. The position was further aggravated by the decline in India's export trade in coal and the displacement of Indian coal even in internal markets by the South African and other foreign coals. The balance of trade in favour of India of 1·18 million tons of coal in 1920 was turned into an adverse balance of 0·81 million and 1·14 million tons in 1921 and 1922 respectively. The causes of this debacle have been dealt with at length in the Reports of the Tariff Board Enquiry of 1924 and of the Indian Coal Committee, 1925 ; they need no reiteration here.

There is, however, one remarkable feature about this period that must be noted. In spite of the serious fall in production in 1920 and the two or three lean years that followed, prices, particularly of Bengal-Bihar coal, continued to rise. The increase in the case of Bengal coal was from Rs. 6-5-0 per ton in 1920 to Rs. 9-2-0 per ton in 1923 ; Bihar coal rose from Rs. 4-9-0 per ton in 1920 to Rs. 6-15-0 in 1922 and Rs. 6-14-0 in 1923. But in the next three years, when production rose to and slightly beyond the 1918 level, there was a sharp decline, so that in 1926 the price of Bengal coal was Rs. 5-4-0 per ton and of Bihar coal Rs. 4-9-0 per ton. The fall was not due to any large over-production, but was a symptom of a world-wide subsidence in prices from the immediate post-war boom years. As will appear later, the fall in prices continued over the next ten years, though in the latter half of that period, other forces were at work in India to bring coal prices down to uneconomic levels.

The depression in the coal industry focussed the attention of the Government and the trade to problems which demanded urgent solution. Some consideration began to be given to the devising of ways and means for restoring prosperity to the industry and ensuring its development on sound lines. The steps taken to bring back to the coal-mining industry its lost markets, both

internal and foreign, achieved a measure of success. But in regard to the development of a sound structure and sound mining methods and the proper utilisation of the country's resources, Government's policy continued to be one of *laissez faire*, and the industry, if anything, encouraged Government to adopt this attitude. Many of the problems of the coal industry for which Mr. Treharne Rees and the Coalfield's Committee had suggested remedial action in 1920 consequently persist to-day

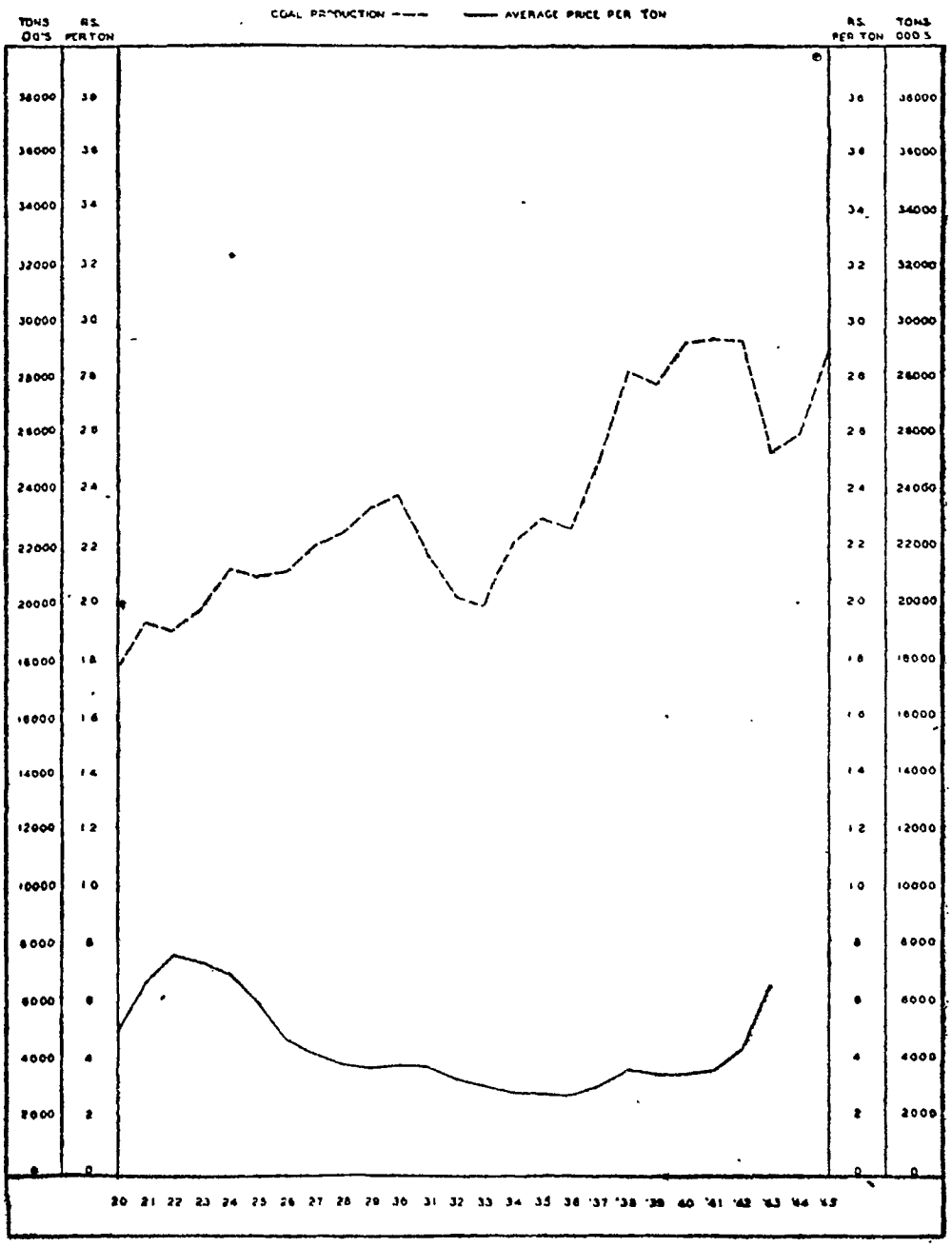
7. We come next to a short-lived period of increasing production from 1927 to 1930. Many of the lost coal markets had been recaptured and there was also an appreciable revival of industrial activity. Equally, the continuing fall in prices made coal a more attractive proposition as a source of industrial power. But soon the economic depression of 1930 and of the subsequent years, aided and abetted by the fundamental weakness of the Indian coal industry, exposed the industry to the most serious economic blizzad in its history. There was a sudden fall in production in 1931 of nearly 2 million tons. Worse was to follow ; in 1933, output was below the 1918 figure and approximated to the bad years of 1921-23. Prices fell, too, and reacted in a curious, though not illogical, way in boosting output to the point of over-production. Many collieries closed down, but others, in the struggle for survival, tried to cope with the steadily falling prices by resort to large-sale outputs through "slaughter" exploitation often ofthe best quality of coal and, in the result, found that over-production depressed prices still further. As stated. production in this period was at its lowest in 1933 when the pit-head price of Bengal coal was Rs. 2-14-0 per ton and of Bihar coal Rs. 2-15-0 per ton. The increase in production in the next three years, without a counter-balancing demand, forced prices to the lowest level reached over many years ; Bengal coal in 1936 was selling at Rs. 2-9-0 per ton and Bihar coal at Rs. 2-10-0 per ton. The Coal Mining Committee, appointed by the Government of India, towards the end of 1936 for the purpose of reporting on the measures necessary for securing the safety of those employed in the mines and preventing the avoidable waste of coal, had perforce to direct its attention also to the serious economic conditions described above.

8. The years from 1937 to 1942 form another natural period in the history of coal production in this country. These years saw a steadily increasing internal demand ; and a urther fillip was given to the export trade by the grant in 1936 of a special rebate in rail freight and port terminal charges. The export trade of about 0·2 million tons in 1935 and 1936 rose rapidly to 0·77 million tons in 1938 and 1·22 million tons during 1939, exclusive of shipments to Burma (approximately 465,000 tons in 1939). From 1938 on wards, special shipments were being made to China, which was facing a critical coal situation with the advance of Japan west-wards. The increase in demand during this period produced better prices also and, though by 1942 the prices (Rs. 4-8-0 per ton for Bengal coal and Rs. 4-0-0 per ton for Bihar coal) were still at the level of the 1927 prices, they had risen by nearly 75% over the lowest level of 1936. The prices mentioned for 1942 refer, however, only to Government purchases of coal from the industry. During the first three war years here was a considerable increase in industrial activity ; likewise there was some increase in coal production—but there was not enough coal to meet all needs. The inevitable shortage, accentuated to a degree by transport difficulties, raised prices, in many cases, to fantastic heights for ordinary purchasers.

9. The years 1942-45, but more particularly the first two years, brought about a coal famine of unparalleled proportions. There was a sudden steep

drop in production, amounting to over 4 milion tons in 1943 over the raisings of the previous year. For this many factors were responsible. The depression years of 1931 to 1936 had left behind a legacy of inadequate plant replacement and renewals were well-nigh impossible after the outbreak of he war. The mines, therefore, had to work ill-equipped. Labour found more attractive

THE FLUCTUATION IN PRICES AND PRODUCTION OF COAL FROM 1920-45



and more profitable employment elsewhere, especially on military works. When coal was raised, there were not enough wagons to carry it to the consumers, and the congestion at collieries reacted on output. Prices naturally rocketed sky-high in these conditions. As this happened at a time when war production made the utmost possible calls on coal, two things became essential. Firstly, every effort had to be made to arrest the decline in raisings and to boost production. Secondly, control over prices became equally, if not more, necessary. But it was only in the middle of 1944 that any positive steps in these directions were taken. Thereafter, a strict control over prices, though not ungenerous to the collieries, was imposed. In the field of production, special steps were taken to recruit labour for the coalfields, to import machinery through Government channels or on Government account, and collieries were offered substantial financial inducements in the shape of bonuses on production and concessions in regard to Excess Profits Tax, etc. That the action taken succeeded to a degree is shown by the fact that raisings in 1945 were nearly 3 million tons over those of1944. This year is also remarkable in that the Bihar field reached the high-water mark of its production at the figure of 16·59 million tons. But it is probably true that this large output was achieved by the opening of many small mines producing inferior grades of coal. Curiously enough, the Bengal field produced in this year much less coal than in any year between 1938 and 1942.

10. As a corollary to Appendix V, showing output figures from 1920 onwards we attach another statement (Appendix VI) showing the prices of coal in the various Provinces and States over the period 1920-43. Assam, the Punjab and Baluchistan coals have throughout been priced high, but this is more due to the difficulties and the cost of working than to their commercial value. It should also be borne in mind that because of their geographical situation, these mines enjoy a price advantage over Bengal and Bihar coals in certain areas. We reproduce below a graph showing the fluctuations in prices and production since 1920.

Sizes Of The Units Of Production.

11. We have dealt with raisings so far from the point of view of total Indian production but, it is equally interesting, and in some respects more instructive, to consider the sizes of the units of production. For this purpose, we attach as Appendix VII a statement showing for the years 1920 to 1942 the total number of collieries that were working in the country and the number and the raisings of collieries classified according to output. Save for the years following the first world war, the total number of collieries working follows a normal pattern ; during a period of depression, as for example from 1931-36, there is a reduction in the total number of enterprises but a return of the industry to more prosperous conditions is accompanied by an increase in the number of working collieries. The surprising thing is that the number of concerns continued to be high during the bad years of 1920-26. The widest fluctuation is generally in the number of collieries producing up to 5,000 tons per annum, though there are minor variations in regard to larger mines also ; but apart from one tendency to which we shall refer later, these variations are not of very great consequence. The opening up of small collieries during periods of prosperity and their closure during bad times both have a most deleterious effect on the proper exploitation of the country's resources. These collieries are generally ill-equipped and their object is to secure the easiest coal. The result, not infrequently, is that the coal-bearing areas become pock-marked with small shallow workings which may lead to unsound development in the neighbourhood and may, as has happened in the Jharia field, be the cause of disastrous fires.

The tendency, to which reference was made above, is the continued growth in the number of arger collieries producing more than 50,000 tons of coal per annum. This tendency has been particularly marked since 1934 and is, to some extent perhaps, indicative of the all-out and frequently indiscriminate attempts that were made to boost production so as to reduce raising costs. In 1940-41 over 25% of the collieries in India were producing over 50,000 tons of coal per annum and the total output of this group was in the neighbourhood of 80% of the Indian production. This by itself is not an unwelcome trend and we shall have more to say about it elsewhere in our report. Incidentally, we think it will be of interest if we state the position in this matter in the United States of America in 1944—

Number of mines producing	more than 500,000 tons per annum . . .	310
Do.	between 200,000 and 500,000 tons per annum .	518
Do.	between 100,000 and 200,000 tons per annum .	559
Do.	between 50,000 and 100,000 tons per annum .	540
Do.	between 10,000 and 50,000 tons per annum .	1,776
Do.	less than 10,000 tons per annum . . .	3,225
	Total .	6,928

Coal Consumption Trends.

12. A separate statement is attached as Appendix VIII showing the despatches of coal from the various Provinces during the years 1920 to 1945. Figures of despatches from Indian States are not readily available and are, therefore, not included in the statement. The value of the statement is not, however, materially impaired by the absence of this information except perhaps, from 1932 onwards, as in these years there was a steady increase in the production of Indian States until in 1939 it was more than double the output of 1932. A reasoned analysis of the inter-play of supply and demand is, therefore, rendered more difficult for the latter years of this period, but some interesting conclusions can nevertheless be drawn. During the years 1922-24 there is clear evidence of over-production in the Bihar fields; this was a period of a large increase in the number of collieries operating and of small collieries, in particular. There is, again, evidence of over-production from 1930 to 1936 but the reasons for this are different. Apart from the vicious circle of low selling prices, lower raising costs and increased production in certain cases, the demand on the Jharia field was falling so rapidly that production though declining, could not adjust itself for the reason that a curtailment of production has not, from the nature of things, that degree of elasticity. In the matter of balanced production the Bengal field has had a more satisfactory history, but the field is served by somewhat better transport facilities and has a more assured market for its coal, as it constitutes the main source of supply for export and bunker requirements. The development of the Central Provinces fields as a source of supply of some consequence has also not been characterised during its course by any period of over production.

13. The bulk of the coal despatched has gone to a few principal consumers and we attach, as Appendix IX, a statement of coal despatched during the years 1920 to 1945 on account of the railways, the iron and steel works, bunkers, exports, cotton textile mills, bricks and tiles including potteries and cement, and as soft coke for domestic purposes; we shall deal with the period from 1943 in the next chapter. Much of this information has been gleaned from "Indian Coal Statistics" but other sources relied upon have been indicated where necessary. We should mention that the consumption

of iron and steel works for the years 1920 to 1935 is an estimate, as also the figures in respect of cement from 1920 to 1942. Having regard to the dubious nature of the statistics hitherto maintained for the coal industry in India, we must sound a note of caution as regards some of the figures included in the statement. But the following broad conclusions can be drawn from a study of this statement:—

(*i*) The consumption of the railways has steadily increased over the period and at the close was nearly 50% over that in 1920.

(*ii*) On the industrial side, there has been a considerable increase in the consumption of coal by the iron and steel, cotton textiles and cement industries.

(*iii*) Bunker requirements are on the downward grade, perhaps in consequence of the increasing use of oil-fired ships.

(*iv*) The export trade has fluctuated though an upward trend was noticeable in the immediate pre-war years.

(*v*) Considering the size of the country and the necessity of avoiding wasteful use of other fuels, soft coke as a source of domestic fuel has made only slight headway.

14. In our study of consumption trends we have been greatly handicapped by the absence of information regarding the classes of coal that have been used by the various consumers. But it is reasonable to assume that during certain periods at least, as for example, in the years from 1931, consumers increasingly sought and got the better classes of coal. This was a period of intensive exploitation of the better coals, which the Coal Mining Committee, 1937, attributed to the relatively more profitable prices of superior coals. It should not be forgotten that the raising cos s of the best coal and of inferior coals, under comparable working conditions, are practically the same. In India little thought had been given to the proper utilisation of coal resources, and looking at these years of over-production of the higher grades of coal, it may be said that we used our wasting assets in an unscientific manner. Lack of information about the breakdown of the classes of coal consumed by various users also renders impossible a closer correlation between the prices of coal and the demand for different grades, but it is not difficult to infer what must have happened. In the best of times, the cost of raising coal and the prices of coal in India have been much below the levels in other countries. But in the early thirties, prices fell to yet lower levels and the continued cheapness of coal, together with the increased production of the superior grades, led inevitably to a demand from consumers for the best coal available. If the lower grades of coal were produced at all in appreciable quantity, the markets for them must have been very restricted.

Conclusions And Recommendations.

(1) The history of coal production in the last 25 years falls into five periods, during two of which the industry has been assailed by evere depressiou. Periods of falling demand were also periods in which there was considerable over-production.

(2) There has lately been a continued growth in the number of larger collieries.

(3) The bulk of the coal is consumed by a few principal consumers, but the absence of statistics prevents a study of consumption by classes of coal.

CHAPTER IV

ESTIMATE OF FUTURE REQUIREMENTS

Coal Consumption : 1943 to 1946.

Before we attempt an estimate of our future requirements of coal, it will be useful to analyse recent consumption. Of this, detailed and accurate information is available, as the imposition of control on the distribution of coal since the closing months of 1943 necessitated its collection. Details of despatches generally, and to certain important consumers, for the period up to 1942 have been given in Appendix IX ; but during peace-time and even during the first four years of the war, the statistics compiled were not very accurate.

As we shall show elsewhere, the control over distribution initiated in March, 1942, first took the form of a regulation of wagon allotments to collieries, but in 1943, the coal position throughout the country had become so serious that control appeared inevitable not only over the allotment of wagons to collieries but also over the allocation of coal to consumers. In October, 1943, the Government of India, therefore, decided to introduce a coal rationing scheme and targets were fixed for the requirements of about 61 classes of consumers in the country. These targets were designed to provide to the different classes of consumers the quantity of coal deemed necessary having regard to the efficient prosecution of the war and the maintenance of essential production. The total target for a whole year was fixed at 25.524 million tons which was allocated as follows :

	In tons per month
'A' Class.	
1. Bunkers	110,000
2. Exports	101,588
'B' Class	
1. Nine Government Railways and Light Railways	836,825
2. Inland Steamer Companies	64,000
'C' Class	
1. Municipalities and Water Works	11,000
2. Engineering & Manufacturing Works	820
3. Electric Supply Cos. & Electrical concerns	101,420
4. Gas Companies	10,000
'D' Class	
1. Iron & Steel Works	247,000
2. Refractories & Potteries	10,500
3. Copper Corporations	3,500
'E' Class	
1. Ordnance Factories	12,000
2. Defence, Aviation, Road-building, P.W.D., District Boards	50,000
3. Opium Factories	250
4. Government requirements (from H.S. collieries)	1,700
'F' Class	
1. Cement Factories	70,000
'G' Class	
1. Woollen Mills	6,000

	In tons per month
'H' Class	
1. Cotton Mills	155,000
2. Ginning & Pressing Factories (for 7 months only)	16,000
3. Engineering Works & Manufacturing Works	16,000
4. Foundry Works	500
5. Gas Companies	20
6. Hospitals	80
7. Rubber Works	2,000
8. Fire Extinguishers	60
9. Paper Mills	30,000
10. Indigo concerns	100
11. Tobacco Manufacturing	1,960
12. Lime Stone Works	2,412
13. Enamel Works	800
14. Mica Concerns	1,300
15. Match Factories	250
16. Foodstuffs	7,000
17. Leather Works	1,900
18. Glass Works	6,000
19. Oil Mills	3,000
20. Ice Factories	1,500
21. Chemicals	11,500
22. Soap Works	600
23. Distilleries	3,200
24. Dairies	200
25. Miscellaneous concerns	5,656
26. Jails	90
27. Sugar (September to April)	10,000
28. Universities, Colleges and Government Technical Institutes	760
29. Jute Mills	56,940
30. Re-rolling Mills	6,860
31. Tobacco curing firms (October to April)	7,200
32. Mysore Govt. retail requirements (from H. S. Collieries)	100
33. Miscellaneous (from H. S. Collieries)	50
'I' Class	
1. Steamer Services (Inland)	6,500
2. Tramway Companies	80
'J' Class	
1. Domestic and small industries with less than one wagon requirement per month 2. Small industries requiring more than one wagon per month 3. Rice Mills 4. Brickfields	100,000
'K' Class	
1. Coke Ovens	14,000
'L' Class	
1. Firms recommended by the Chief Mining Engineer, Railway Board	60
Class	
1 Tea Industry	4,000

'N' CLASS

	In tons per month.
1. Brick manufacture for civil requirements :	
(a) Bengal	6,000
(b) United Provinces	1,000
(c) Bihar	400
Casual sanctions for various concerns under all classes	9,319
Total requirements of industries	1,023,167
Grand Total of rationing suggested	2,137,000

The rationing scheme was to cover the output of all coalfields other than those of Assam, the Punjab, Baluchistan, Sind and Kashmir. The output of these fields was comparatively small and though a measure of control was exercised over it, distribution was kept out of the main rationing scheme. But the targets fixed in October, 1943, could not be implemented, mainly because of the serious fall in coal output in the country from November, 1943. Instead, from then onwards, a system of monthly allocations to the various classes of consumers had to be introduced ; the allocations for each month were to be based on the estimated stock position of each industry and the possible fluctuations in requirements. Substantially the same system is still in force. Although there have been complaints, the system, on the whole, seems to have worked fairly successfully. There has, however, always been a lag between the quota fixed in a month and the actual despatches, the reason being coal or wagon shortages or both and other transport difficulties owing to war conditions.

2. In the table below which refers to the period November 1943—April 1946, we give the total allotments and despatches made in a year and the annual despatches to certain principal consumers.

(in million tons).

	1943 (Novr. and Decr. only).	1944	1945	1946 (January to April only).
Total allocations	3·87	24·98	26·48	9·81
Total despatches	3·18	22·91	25·16	8·96
Despatches for—				
Bunkers & Exports	·14	1·41 (6·2)	1·34 (5·3)	·58
Railways	1·38	9·85 (43·0)	10·54 (41·9)	3·73
Electricity Cos.	·14	1·32 (5·8)	1·58 (6·3)	·54
Iron & Steel (primary producers)	·43	2·64 (11·50)	2·85 (11·3)	1·06
Defence Services	·07	·75 (3·3)	·55 (2·2)	·06
Cement	·14	·74 (3·2)	·89 (3·5)	·28
Cotton Mills	·26	1·6 (7·0)	2·01 (8·0)	·71
Jute Mills	·09	·46 (2·0)	·50 (2·0)	·20
Paper Mills	·04	·36 (1·6)	·42 (1·7)	·16
Engineering Works and Foundries	·04	·29 (1·3)	·28 (1·1)	·05
Coke Ovens	·02 (1·1)	·19 (·8)	·28 (1·1)	·09
Gas Companies	·02	·14 (·6)	.14 (.6)	·04

	(in million tons)			
	1943 (Novr. and Decr. only).	1944	1945	1946 (January to April only).
Provincial quotas (domestic coal, minor industrial requirements etc., etc.)	·10	·91 (4·0)	1·20 (4·8)	·37
Other industries including Refractories and Potteries, Copper, Ordnance factories, Opium, Ice, Woollen mills, Starch, Filatures, Ginning and Pressing factories, Rubber works, Tobacco, Indigo, Lime and stone works, Enamel works, Mica, Match factories, Food products, Leather works, Glass, Oil mills etc., Chemicals, Soap, Distrilleries, Sugar, Dairies, Bricks, Tea and Re-rolling mills	·21	1·46 (6·4)	1·70 (6·8)	·82

N.B.—Figures in brackets represent percentages of total despatches during completed years.

In April 1944, when it was thought that coal raisings had improved, an attempt was made to restore the original idea of a rationed plan and to fix revised targets for various consumers. But for reasons similar to those already mentioned, the idea could not be implemented and Government had to continue to work to a system of monthly allocations. The revised targets proposed for different consumers for April to September are given below and may be compared with the earlier targets.

	Tons per month.
'A' Class	
Bunkering and Export	155,000
'B' Class	
Railways	910,440
Indian Steamer Co.	35,000
Port Trust	25,000
'C' Class	
Municipality & Water Works	11,000
Electric Supply Co.	124,178
Gas Companies	12,000
'D' Class	
Iron & Steel Works	247,000
Refractories & Potteries	13,800
Copper Corporations	3,500
'E' Class	
Ordnance Factories	20,000
Defence, Aviation, Road Building, P.W.D. and District Boards	88,000
Opium Factory	250
Government Requirements (from H. S. Colliery)	1,700

	Tons per month.
'F' Class.	
Cement Factories	75,000
'G' Class.	
Woollen Mills	6,000
'H' Class.	
Cotton Mills	155,000
Ginning & Pressing	(Seasonal)
Engineering, Manufacturing and Foundry Works	32,700
Hospitals	80
Rubber Works	4,000
Fire Extinguishers	60
Paper Mills	36,000
Indigo concerns	100
Limestone Works	2,412
Enamel Works	1,500
Mica Concerns	1,300
Match Factories	250
Foodstuffs	12,000
Leather Works	1,900
Glass Works	8,000
Oil Mills	4,320
Ice Factories	1,500
Chemicals	11,500
Soap Works	600
Distilleries	5,000
Dairies	200
Miscellaneous concerns and casual sanctions	7,656
Jails	90
Sugar	(Seasonal)
Universities, Colleges and Government Technical Institutions	760
Jute Mills	56,940
Re-rolling mills	5,000
Tobacco Manufacturing and Curing	4,000
Bitumen Hessian	100
Mysore Govt. requirements (from H.S. Colliery)	(Seasonal)
Miscellaneous (from H. S. Colliery)	,,
'I' Class	
Steamer Services	6,500
Tramways	80
'J' Class	
Provincial Scheme	100,000
'K' Class	
Coke Ovens	14,000
'M' Class	
Tea Industry	14,000
'N' Class	
Brick manufacturing for civil requirements	(Seasonal)

3. As already stated, the despatches given above are exclusive of those from certain fields and to this extent the figures incompletely represent the consumption of the country during the period. For the fields not included in the monthly allocations (excluding Kashmir which can be ignored), the following figures of total annual despatches are available :

Province.	1944 (in tons)	1945 (in tons)	1946 (in tons) (Jany. to April)
Assam	278,899	285,086	115,363
Baluchistan	74,466	117,127	91,776
Punjab	166,159	155,157	82,122
Sind	6,236	11,043	5,026
	525,760	568,413	294,287

A proportion of these despatches has gone for domestic requirements and the consumption of brick fields. The needs of local industry have also been partly met ; for example, in the Punjab, about 75,000 tons annually were supplied to local cement factories and in Assam, a large quantity was also taken by the railways.

4. If the despatches from the above fields are added to the other despatches, the following position emerges :—

Year	Total (all-India) despatches (million tons)
1944	23·44
1945	25·73
1946 (first four months)	9·25

5. It has always been realised that the inadequate supply of coal to industry in war time seriously affected industrial output even though the country was on the basis of all-out war production ; mention need be made here only of the drop in the output of iron and steel works and of the appreciable loss in the output of cotton textile mills due to coal shortage. It would be wrong, therefore, to take the figures given above as representing optimum requirements. Had there been plenty of coal and had the position in regard to other raw and semi-finished materials and transportation been such as to permit of full production for both war and civilian needs, the coal consumption of the country would undoubtedly have been higher.

6. In order to obtain some idea of the classes of coal despatched to the principal consumers, we requested them to furnish to us a break-down, by grades, of the coal received by the railways, iron & steel works, electricity companies, cement works and cotton textile mills during each of the years 1943 to 1946. No useful information has been received in respect of the railways and none at all for electricity companies ; further, the details for

cotton textile mills cover only a period of 9 months from June 1944 to February 1945. What we have gathered is, however, given below :

Despatches of Coal to certain Industries by Grades (tons)

Year	Selected Grade	Grade I	Grade II	Grade III A & B	Ungraded	Total
1	2	3	4	5	6	7
Iron & Steel Works						
1943 . .	2,285,105	561,103	108,084	24,253	..	2,978,545
1944 . .	2,040,653	360,397	145,643	13,958	..	2,560,651
1945 . .	2,299,924	232,002	81,150	22,761	..	2,635,837
Cotton Textile Mills						
1944-45 9 months June—February).	168,300	139,962	83,262	54,853	823,022*	1,269,399
Cement Works						
1943 . .	202,298	583	..	..	322,320	525,201
1944 . .	300,901	263	4,507	4,823	402,966	713,460
1945 . .	429,276	9,225	21,711	3,600	448,895	912,707

*(Includes 215,689 mixed grades and 171 hard coke).

NOTES

(*a*) For the sake of uniformity, all coal classed as Selected Grade by the Coal Grading Board and since 1944 as Selected A & B under the Colliery Control Order, 1944, has been shown as Selected Grade.

(*b*) As regards the Cement figures,

(*i*) those for 1943 do not include details in respect of the Sone Valley Portland Cement Co., four of the five Dalmia Works, the Kalyanpur Cement Works, Andhra Cement Co. and the Bhadravati Iron & Steel Works,

(*ii*) those for 1944 do not include details in respect of the Sone Valley Portland Cement Co., the Kalyanpur Cement Works, Andhra Cement Co. and the Bhadravati Iron & Steel Works,

(*iii*) those for 1945 include details in respect of the Sone Valley Portland Cement Co., for February to December only and details of Andhra Cement Co., the Kalyanpur Cement Works and the Bhadravati Iron & Steel Works are not included, and

(*iv*) details of despatches from Assam, Punjab, Sind, etc., are included.

(*c*) "Ungraded" includes coal not graded and coal the grades of which have not been indicated in the replies received.

7. Certain additional information of value in respect of iron and steel works is given below.

Tata Iron & Steel Co.

The details furnished show receipts of Jharia Selected Grade coal separately and on the assumption that this is all coking coal (but not all the coking coal sent to the Company), we get the following result :—

	Total coal received	Selected Grade Jharia (coking)
1943	2,020,361	1,181,093
1944	1,712,728	1,134,140
1945	1,770,324	1,367,399

Indian Iron & Steel Co.

This Company have given a detailed break-down of their receipts of coking and non-coking coal as below :—

Year	Coking coal (in tons).			Non-coking coal (in tons).	
	Selected Grade	Grade I	Grade II	Grade II	Total (in tons)
1943	864,517	5,199	3,603	81,797	955,116
1944	654,960	75,128	53,672	56,948	840,708
1945	683,359	104,808	15,836	53,917	857,920

8. The conclusions that can be drawn from the foregoing statistics, read with the details given in paragraphs 1 and 2, are :—

(*i*) An exact comparison is obviously not possible between the figures of despatches given in para. 2 and the details of receipts shown here.

(*ii*) The coal received by Iron & Steel Works is well below the target originally contemplated.

(*iii*) Considerable quantities of Selected Grade coal have been despatched to cotton textile mills and cement works.

9. We have received a useful statement for December, 1945, from the Railway Board's representatives during their oral examination. This is reproduced in a condensed form below :—

Output and Despatches of Coal from the Jharia Field for December 1945

	Coking coal	Non-coking coal
Selected A		
Output	103,482	329,077
Despatch	159,367	395,780
Selected B		
Output	281,001	212,244
Despatch	297,323	206,811
Grade I		
Output	253,536	82 850
Despatch	189,926	16,509
Grade II		
Output	335,579	11,248
Despatch	244,062	9,666

	Coking coal	Non-coking coal
Grade III A and B		
Output	248,510	28,604
Despatch	105,172	2,006
Ungraded		
Output	11,375	462,904
Despatch	13,676	396,956
Total		
Output	1,233,483	1,126,927
Despatch	1,009,526	1,027,728

Despatches: Break-down (for December 1945).

	Selected A		Selected B		Grade I.		Grade II.		Grade III A & B.		Ungraded.	
	Coking	Non-coking	Coking	Non-coking	Coking	Non-coking	Coking	Non-coking	Coking	Non-coking	Coking	Non-coking
Railways	55,312	70,370	80,247	108,376	148,031	..	153,174	5,166	22,806	2,006	2,814	172,940
Iron & steel (primary producers)	51,623	37,110	109,726	4,305	14,070	..	2,667	..	1,302	..	945	798
Bunkers and Exports.	13,273	69,888	9,870	420	8,610	..	..	..	..	..	273	..
Others	39,159	218,412	97,480	93,710	19,215	16,509	88,221	4,500	81,064	..	9,644	223,218

Three points should be explained about these details :—

(*a*) The despatches in a month are not necessarily all from the same month's output ; previous stocks are also drawn upon. This is why the despatches of Selected A coking coal exceed the output.

(*b*) Ungraded coal is not all inferior to Grade III A & B ; it is coal that has not been graded under the Colliery Control Order, 1944, and may include certain proportions of high grade coals, both coking and non-coking.

(*c*) Though the figures refer only to one month, they may reasonably be taken to be an indication of distribution trends in war-time.

10. So far as distribution is concerned, and taking Selected A & B and Grade I as comprising high grade coal, the following conclusions can be drawn from the above tables; the figures in brackets denote the proportion of despatches of certain classes of coal to the total despatches to a consumer :—

(*a*) The railways were given 283,590 tons (34·5 per cent.) of good coking coal and a minimum of 178,746 tons (21·7 per cent.) of good non-coking coal ; the quantity of high grade non-coking coal may be higher if the ungraded despatches of 172,940 (non-coking) are taken into account.

(*b*) Of the total despatches to iron & steel works (primary producers) 175,419 tons (78·8 per cent.) were of good coking coal and 41,415 (18·6 per cent.) of high grade non-coking coal. It must not, of course, be assumed that *all* the requirements of primary producers are of coking coal. The break-down (by percentages) given to us by the Indian Iron & Steel Company of their average coal requirements for 1946 to 1950, working to full capacity, is as follows :—

Coking coal	91·08 per cent.
Non-coking coal	8·92 per cent.

As against this, their actual receipts for 1943 to 1945 appear, from para. 7, to have been as follows :—

	1943	1944	1945
Coking coal	91·41%	93·22%	93·71%
Non-coking coal	8·59%	6·78%	6·29%

From the point of view of aggregates only, the position has not been unsatisfactory. As regards quality, receipts of Selected Grade and Grade I, during the same years, also appear satisfactory.

Year.	Selected Grade.	Grade I	Total.
1943	90·58	·52	91·10
1944	77·88	8·92	86·80
1945	79·60	12·24	91·84

(*c*) 31,753 tons of good coking coal went for bunkers and exports out of a total of 102,334 tons.

(*d*) For all other consumers, a minimum of 155,854 tons (17·7 per cent.) of good coking coal and a minimum of 328,631 tons (37 3 per cent.)—the quantity may be much larger—of good non-coking coal were despatched. Under this head would be included the coal despatches to coke-ovens which require good coking coal, but the total for December, 1945, could not have been more than 35,000 tons. We are not aware that there are other consumers who essentially require good coking coal.

Our conclusions and recommendations, following from the foregoing, will be given in later chapters on the regulation of use and conservation.

Estimate of Future Requirements.

11. With the end of the war, it became possible early to estimate the country's immediate future requirements of coal on a peace-time basis. After a careful study of war-time consumption and existing industrial capacity, the following estimate of requirements for 1946 and 1947, to be met from coal-fields other than those in Assam, Punjab, Baluchistan, Sind and Kashmir, was prepared by the office of the Coal Commissioner :—

	Tons.
Bunker and Export	2,400,000
Railways	10,800,000
Essential steamer services	480,000
Ports	180,000
Municipalities and water works	180,000
Electric Supply	2,100,000
Gas Company	180,000
Steel Works (Primary producers)	3,360,000
Potteries	240,000
Refractories	180,000
Copper Corporation	60,000
Ordnance Factories	84,000
Defence	300,000
Cement	1,200,000
Woollen Mills	120,000
Cotton Mills	2,400,000
Ginning & Pressing (seasonal)	200,000
Jute Mills	660,000
Engineering works and foundries	600,000
Paper Mills	480,000
Tobacco Curing (seasonal)	120,000
Glass factories	300,000
Chemical Industry	300,000
Sugar Mills (seasonal)	100,000
Tea Gardens (seasonal)	110,000
Re-rolling Mills	180,000
Provincial miscellaneous requirements (including domestic coal and coke)	2,400,000
Coke ovens	600,000
Brick burnings (seasonal)	1,200,000
Miscellaneous	720,000
	32,234,000

In putting forward the above estimates, we are not suggesting that it is possible to meet requirements immediately. On the contrary, the indications are all to the effect that, if no careful planning is done and the coal industry and the transport system are not properly organised, the railways will not be able for many years to transport very much more coal than they have done in the last year or two, nor is production likely to reach the level which will make despatches of this order possible. But the estimates do probably represent, subject to certain variations, the quantities of coal which are at present required by existing industries and other consumers in the country. The estimate can, therefore, be used as a basis for planning both production and transport and also as a starting point for computing long-term coal requirements in the light of industrial plans so far made.

12. We have been specially charged by the Government of India with the duty of preparing long-term estimates of coal requirements of the country. This we would in any case have undertaken, because on such estimates alone can an intelligent plan for the development of the country's resources be based. Indian industry suffered during the war due to coal shortages and, as we have emphasised before, large-scale plans for industrialisation can be implemented only if adequate supplies of coal are available.

Before we embarked on this examination, we decided that any estimate of coal requirements for a period beyond the next ten years must necessarily be unreal. Even for the restricted period the estimates, however carefuly prepared on the basis of available information, have, from the nature of things, an element of uncertainty. The best laid plans can go awry and the danger is greater when a country has to depend for the bulk of its capital equipment on imports. The position is rendered more difficult at the present time in view of the vast scale on which rehabilitation and reconstruction are being planned in the countries ravaged by war. On the other hand, however, the country is more alive now than ever before to the need for development in the industrial and other fields as the sole means of improving the economic condition of the people. Fortunately, too, the Government of India and Provincial Governments have begun to display some keenness and some initiative in the matter and there are certain world factors which make the present a propitious moment for India to embark on extensive industrialisation.

13. As is well known, the Government of India set up some time ago a number of panels composed of non-officials and officials to draw up detailed plans for the development of various industries. Twenty-nine such panels were appointed and the late Planning and Development Department of the Government of India furnished to us reports submitted by the following eleven Panels :—

1. Iron & Steel (major).
2. Cotton Textiles.
3. Sugar, Alcohol and Food Yeast.
4. Non-ferrous Metals.
5. Heavy Chemicals.
6. Electro-chemicals.
7. Hosiery.
8. Rayon and Artificial Silk.
9. Glass.
10. Paper, Pulp, etc.
11. Ready-made clothing.

Government have already passed orders on the Reports of the Panels on 2, 3 and 5 to 8 above. The others are still under consideration and the reports of the remaining Panels presumably are not yet ready. The Industries & Supplies Department of the Government of India have also given us rough forecasts of likely development in the next ten years in a number of other industries, it seems however that these estimates are based on the opinions of certain officers and are not the result of the more thorough consideration given by the Panels. We have also obtained some information from the Railway Board, from the Electrical Commissioner and the Textile Commissioner and from one or two consumer Associations.

14. All material made available to us has been studied and the result is summarised below.

Iron and Steel Industry

For finished steel, the present production capacity (including that of Government Ordnance factories) is about 1,200,000 tons per year, and this is likely to be increased by 200,000 tons per year when the Duplex Plant of the Steel Corporation of Bengal comes into full production in 1947. On the basis of post-war plans reported by the Central and Provincial Governments it seems likely that the country can absorb another 1 to 1½ million tons of steel per annum from the next few years. The target for future production may, therefore, be placed at 2½ million to 3 million tons finished steel per annum. The Panel thought that the existing companies would probably increase the capacity by ½ million tons per annum (including the additional 200,000 tons from the Steel Corporation of Bengal) in the next five years and on that basis recommended the installation of one new unit producing ½ million tons initially and capable of being expanded to a production of 1 million tons later.

We have been informed by the two principal iron and steel companies that their consumption of good quality coal on the basis of present production capacity is as follows :—

	Coking	Non-coking
Tata Iron & Steel Co.	1·8 million tons per annum.	0·5 million tons per annum. (No figure has been given by the Company but this is an estimate based on previous consumption).
Indian Iron & Steel Co.	1·13 million tons per annum.	0·12 million tons per annum.

The coal consumption of the Mysore Iron & Steel Works is negligible, and no details are available of such consumption in Government Ordnance factories Confining our attention to coking coal only, the requirements, may be placed at 2·93 million tons ; but the Tata Iron & Steel Co., have stated that their demand could be reduced to 1·56 million tons, if by blending and washing, the ash content of the coal charged into the coke ovens can be reduced to 15%. The plans for expansion drawn up by the three principal works are all likely to mature within the next five years ; but the increased production of ½ million tons of finished steel is not likely to require any additional output of pig iron, of which there is already sufficient surplus production in the country. It is unlikely, therefore, that coking coal requirements will go up merely because of

the increased steel output in the present works. But the Indian Iron and Steel Co., have stated that from 1948 onwards they will need ·77 million tons more of coking coal, apparently for their new enlarged coke oven batteries. On the whole, we think that for the five year period from 1948 the additional demand for coking coal should not exceed ·8 million tons. The new steel works proposed is estimated to take five years for installation and a further two years to come into full operation. The blast furnaces should, it is stated be designed for a pig iron output of about 720,000 tons per annum, requiring nearly 1 million tons of coking coal. We are aware that the Iron and Steel Panel have assumed that 1·75 tons of coal are required for the manufacture of 1 ton of steel but this, we think, is an overestimate, as will appear from the following :—

According to the written evidence of the Tata Iron & Steel Co.

(*i*) 3,380 lbs. of coal make 2,240 lbs. of coke, and

(*ii*) 1,990 lbs. of good quality coke are needed for the manufacture of 1 ton of pig iron.

The quantity of coal needed for the manufacture of 1 ton of pig iron thus comes to 3,003 lbs. approximately.

It is understood that 1·3 tons of the mixture must be charged into the melting furnaces to produce 1 ton of steel, and that practice in India is generally that in the mixture pig iron and scrap are used in the proportion of 3 : 1 ; the proportion is stated to be 3 : 2 or even 1 : 1 in certain other countries.

The quantity of pig iron needed for the manufacture of 1 ton of steel is therefore, $\frac{1\cdot3\times3}{4}$ *i.e.*, 1 ton (approximately).

Hence 3,003 lbs. or just over 1·33 tons of coal are needed for the manufacture of 1 ton of steel.

The requirement of 1·75 tons given by the Panel apparently proceeds on the assumption that no scrap is charged into the melting furnaces with the pig iron ; this, we understand, is not in accordance with practice.

On our basis, the coking coal requirements from 1954 onwards will be 4·73 (2·93+·8+1) million tons. There will be a further demand if and when the new unit is expanded to a capacity of 1 million tons of finished steel ; but this need not be considered for the present. With the increased production of pig iron and steel, the demand from the works for non-coking coal is certain to rise. On a *pro rata* basis and taking into consideration the facts that in some cases power may be drawn from outside sources, this increase might be about ·5 million tons per annum from 1952 onwards, making a total of 1·129 million tons.

The total coal requirements from 1954 onwards would thus be about 5·58 million tons ; but it is necessary to emphasise that some of the increase may be effective from earlier years.

Railways

Despatches of coal to railways in 1945 were over 10·5 million tons and the Railway Board have mentioned the following factors as likely to vary their future requirements :

(*a*) 2,500 miles of new lines are proposed to be constructed from 1947-48 at the rate of 500 miles per year. This programme will add 130,000 tons of coal each year to the railways' present requirements ; the increase from 1952-53 will thus be 650,000 tons per annum.

(*b*) On the basis of present industrial capacity and other activities, the Railway Board expect that goods traffic from 1947-48 will be about 20% above the pre-war level and from 1952-53 10% only above the pre-war level; the reasons for this anticipated regression are not known to us. The coal requirements for goods traffic will thus be higher to that extent over pre-war consumption. Goods traffic in war-time was of course very much higher than in the pre-war years, the average net ton miles for the war period being about 21·6% over the figure for 1938-39. In view of the considerable plans for industrial and other development in the country, we think that for the next few years goods traffic will remain at the war-time level and that eventually it will surpass the peak level of 1942-43.

(*c*) The coal requirements of the railways will be reduced in consequence of electrification schemes that may be implemented. The question of electrifying about 1,350 miles of track is now under consideration and if all the schemes are implemented, nearly 500,000 tons of coal per annum are likely to be saved on the basis of present consumption.

(*d*) Furnace oil has replaced coal over certain sections of the railways and its use may be extended in favourably situated areas. The possible reduction in coal consumption on this account cannot be estimated at present, but it is unlikely to be very large.

Two factors which have not been mentioned above are the extent of the passenger traffic in future and the quality of the coal that the railways may be required to burn. On the first point, we feel certain that more trains will undoubtedly be necessary to cope with the increasing demand from the travelling public. As regards the second matter, it may become necessary for the railways to use medium quality coals, for certain services, in the interests of planned utilisation; the effect of this, too, will be to increase the total coal demand of the railways.

We estimate that the railway coal requirements for 1947 will be about 11 million tons. Taking all factors into consideration, we are of the opinion that there may be fluctuations in railway requirements in subsequent years, but we expect that by 1956 these requirements will be stabilised round 11 million tons per annum. In this connection it will be interesting to note that the coal despatches for railways for the immediately pre-war years were as follows:—

	Million tons.
1936	7·60
1937	8·05
1938	8·28
1939	8·45

Cotton Textile Industry.

Present production capacity is 4,800 million yards per annum from 10.274 million spindles working. Of these, however, only 6·5 million spindles are on power generated directly from coal, the others being on electricity. It is planned to increase the production of cotton cloth by 1,700 million yards per annum requiring an additional 2·8 million spindles. Of these, 0·7 million spindles will, it may be assumed, work on electricity, leaving 2·1 million spindles to be motivated by coal.

Optimum coal requirements at present for 6·5 million spindles are 2·16 million tons per annum and the additional demand for coal when 2·1 million more spindles are working will be 0·72 million tons per annum. This makes a total of 2·88 million tons of coal for cotton textile mills.

Associated with the cotton textile industry are starch factories and cotton ginning and pressing factories. With expansion in the production of cloth, there is certain to be an increase of activity in both these directions and the Textile Commissioner has furnished to us the following figures of coal requirements :—

	Present coal consumption (tons)	Estimated future coal consumption (tons)
Starch factories.	19,200 per annum.	24,000 per annum.
Cotton ginning and pressing factories . .	160,000 per annum.	250,000 per annum.

The total coal requirements of the cotton textile industry and associated industries is, therefore, likely to be 3·154 million tons per year, *i.e.*, an increase of 0·815 million tons over present requirements. The time likely to be taken for completing development plans is not stated in the report of the Cotton Textiles Panel but may be taken to be from 5 to 10 years. Half of the above increased coal requirements may, therefore, be assumed to be come effective from 1951 and the balance from 1956.

Electric Supply Companies

The coal consumption of public electricity concerns in 1945 was 1·65 million tons and the estimated requirements for 1946 are 1·8 million tons. Over the next ten years, the Electrical Commissioner anticipates that there will be a steady increase in installed capacity, calling for a progressively increasing additional coal requirement of 0·15 million tons per year, raising the total requirements of electricity companies to 3·15 million tons from 1955.

Cement

A comprehensive plan for increasing the production of cement in the country has been drawn up and is in the process of implementation. The following table gives estimates of production capacity and coal requirements for the years 1947 to 1952 :—

Year	Production of cement (million tons)	Coal requirements (million tons)
1947	3·140	1·300
1948	3·815	1·525
1949	4·475	1·750
1950	4·855	1·900
1951	5 555	2·150
1952	6·005	2·300

The target for maximum production capacity is 6·005 million tons of cement per year from 1952. The coal consumption of the cement works in 1945 was 0·93 million tons and on the basis of the above plan there will be a steady increase in requirements so that the demand from 1956 will be about 2·3 million tons per annum. The estimates of coal requirements take into account the greater efficiency of new plants to be installed ; as against the average coal consumption of 0·42 ton per ton of cement at present, the future requirements are based on a consumption of 0·35 ton of coal per ton of cement.

Sindri Fertiliser Factory

The coal requirements of this factory, which is likely to be in full operation from 1949, have been stated as follows :—

Hard coke 178,000 tons per annum	= 247,222 tons coal per annum
Coal	= 365,000 tons per annum
Total coal .	= 612,222 tons per annum

This is a new requirement which will have to be met in full.

Brick Burning

The supply of coal for brick burning was greatly restricted during war time, the despatches from the rationed fields from 1945 amounting only to about 275,000 tons. A good proportion of the coal from the unrationed fields was of course utilised for this purpose, possibly 350,000 tons. The Industries and Supplies Department estimate that the greatly increased building activity in the future will call for about 1·5 million tons of coal per annum for brick-burning. This constitutes an increase of nearly a million tons of coal per annum over the 1945 consumption.

Paper

The present annual production of paper is 103,883 tons. The proposals of the Panel on paper, pulp, etc., envisage an increase in annual production to 264,000 tons by 1951 and 431,000 tons by 1956 ; this is for paper and boards only and does not include other minor commodities. Some of this increase in production is likely to be in areas served by hydro-electricity and for this reason no extra demands for coal will arise from paper mills so situated. The present demands for coal from paper mills is 0·55 million tons and the Industries and Supplies Department estimate that for the fulfilment of expansion plans coal as below will be required :—

From 1951	0·66 Million tons
From 1956	1·19 ,,

The increase, which will be appreciable only from 1956, will be about 640,000 tons per annum.

Coke Ovens

These are not very large consumers of coal but as their requirements are generally of good coking coal, we may mention that as against the present demand of 314,000 tons per annum the future call will be for 387,000 tons per annum plus 240,000 tons more from 1948. An appreciable quantity of coal is also coked in beehive ovens and future requirements for this purpose may be taken as 150,000 tons per annum.

Bunkering And Exports

We shall deal with this in detail later but may state here that the requirements on this account from 1956 may be placed at about 1·25 million tons per annum.

Domestic Requirements

We would like to see domestic coke consumption greatly increased up to 3 million tons of coal for the manufacture of soft coke from 1956. We shall deal with this later.

Amongst the other figures supplied to us by the Industries and Supplies Department, we reproduce some which show likely increases in coal requirements :

Industry	Present coal requirements (tons)	Coal requirements from 1956 (tons)
Non-ferrous metals	small	3 to 4 million tons (from 1952). (2 to 2½ million tons from 1947)
Chemicals	166,008	480,000
Glass	150,648	1,200,000
Ceramics	114,720	600,000
Fermentation	90,960	360,000
Engineering and foundries (including abrasives and belting)	392,652	783,304
Jute Mills	690,000	480,000 (in consequence of greater electrification of mills.
Total.	1,604,988	7,403,304 (including say 3½ million tons for non-ferrous metals).

We do not understand these figures as they postulate, for instance, expansion of the non-ferrous industry from nil to astronomical proportions and of the glass industry eight times during the short space of ten years. We are therefore inclined to reduce the estimate for these purposes from 1956 to about 3 to 3½ million tons only.

The comparative position for machine tools, the electrical industry, the refractories industry, the leather industry, the rubber industry, lime and stone works, woollen mills, paints and enamels and the soap industry is stated to be as follows :—

Present requirements	420,000 tons
Requirements from 1956.	1,185,000 tons.

Here again we would reduce the future demand to 750,000 tons per annum.

15. The details given in the previous paragraph are summarised below :—

Consumer	Coal requirements from 1956 (million tons)
Iron and Steel	5·85
Railways	11·00
Cotton textile industry	3·15
Electricity companies	3·15
Cement	2·30
Sindri Fertiliser factory.	0·61

Consumer	Coal requirements from 1956 (million tons)	
Brick burning	1·50	
Paper	1·19	
Coke Ovens	0·78	
Bunkers and Exports	1·25	
Other industries mentioned	4·25	
Domestic requirements	3·00	
Other consumers (*viz.*, Steamer Services, Ports, Municipalities, etc., Gas Cos., Tobacco, Sugar, Tea and Miscellaneous included in the rationing scheme).	3·50	(as against 2·07 estimated for 1946 and 1947 in para. 11 with adjustment on account of domestic coal.)
Total	41·53	

The estimated coal requirements from 1956 thus come to slightly over 41 million tons per annum, but many of the increased requirements will have to be met from earlier years. Subject to the considerations we shall come to presently, the aim should be broadly to make provision for a progressive increase in supplies of 1½ million tons of coal a year from now on until 1956, when about 41 million tons will be required.

Factors Influencing Coal Consumption.

16. The estimates we have made take note of certain factors likely to vary the consumption. In the case of the railways, for example, we have mentioned electrification of the track and the use of substitute fuels and have taken them into account in the estimate made by us of railway requirements. Again, the increased use of electricity must react on the coal consumption of other industries, but in the estimates given we have not included its effects on coal requirements. There are other varying factors also and we shall now proceed to specify and deal with them. Briefly these factors are as follows :—

(*a*) the policy to be adopted in respect of the export and bunker requirements of coal,

(*b*) the extensive use of coal as a source of electric power and its consequences,

(*c*) the replacement of coal by other fuels,

(*d*) the increased use of coal for domestic purposes,

(*e*) the measures that may be enforced for conserving the country's coal resources, and

(*f*) the planned utilisation of coal.

(*a*) to (*d*) will vary the quantity of coal likely to be consumed, while the effects of (*e*) and (*f*) will be felt more in regard to the quantities of coal of different grades that will be required rather than on total requirements.

Here we shall deal in detail with (*c*) and (*d*) ; the rest will be taken up in the following chapters.

Replacement of Coal By Other Fuels.

17. One of the factors which has affected the demand for coal all over the world is the increasing tendency of consumers to use other fuels, such as furnace oil, for power generation. In India an example of such substitution was the conversion of the Bombay Cotton Textile mills to oil burning many years ago. On a smaller scale, the North Western Railway have been running oil-fired locomotives on a section of their track in Sind. During the war just ended, difficulty in making adequate coal supplies to consumers gave currency to the belief that Indian coal resources are limited, and that it would be in the interests of conservation if large consumers, favourably situated, were to change over to oil burning. The Government of India examined the question of conversion in considerable detail in reference to the Ahmedabad cotton textile mills, but have since referred it to us for our opinion. We have discussed the matter at length with the Ahmedabad Millowners' Association and the principal oil companies ; with the latter we discussed also the possibility of an extended use of furnace oil by industry in certain other areas.

18. The sponsors of the idea of converting the Ahmedabad cotton textile mills to furnace oil have put forward the following arguments in support of the proposal :—

(*i*) The use of furnace oil will eliminate a coal demand of over 600,000 tons per annum and the saving is important from the point of view of conserving our limited coal resources.

(*ii*) Supplies of coal to the textile mills were uncertain in war time and there were frequent closures and consequent loss of valuable output. It is therefore important to arrange for fuel supplies that will not be liable to periodic fluctuations.

(*iii*) A considerable proportion of coal for the Ahmedabad mills comes from the Bengal/Bihar fields and it is desirable, in the interests of transport economy, to obviate this and to make the transport capacity so released available for other use.

The proposal, however, has come up against one serious economic obstacle, *viz.*, the comparatively high cost of furnace oil at Ahmedabad. The question of conversion had been considered once before in 1938 but on that occasion was abandoned on economic grounds. Coal can be delivered at Ahmedabad between Rs. 33 to Rs. 35 per ton today, but the price of oil at Ahmedabad is Rs. 75 per ton. One ton of oil is equivalent for fuel purposes to two tons of coal and, on this basis, oil is from Rs. 2/8/0 to Rs. 4/8/0 per ton costlier. The increased fuel bill of the cotton mills per annum would thus be from Rs15 to 27 lakhs. The principal reason for the higher cost of oil is the railway freight of Rs. 20/8/0 per ton from Bombay ; this the oil companies describe as iniquitous for a distance of 300 miles when, on coal transported over 1200 miles from the Bengal/Bihar fields, the freight is only Rs. 16 per ton. We enquired from the oil companies whether the installation of a pipe line from Bombay to Ahmedabad would reduce the cost of transporting oil. We understand that this is unlikely to be of help in view of the heavy capital outlay and maintenance costs. In any case, the oil companies did not consider it worth-while exploring the matter further unless there was a certainty that the Ahmedabad mills would continue to draw oil for a minimum period of 10 years.

19. Oil fired boilers have certain advantages, *viz.*,

(*i*) ease of control of temperatures,

(*ii*) maintenance of high temperatures for specialised work ,

(*iii*) convenience of storage and handling,

(*iv*) cleanliness,

(*v*) reduced losses through wastage (no pilferage),

(*vi*) reduction in staff in handling oil as against coal, and

(*vii*) uniformity of quality in the fuel.

The first two considerations are not of importance to the textile mills but the remainder are of some significance. In the opinion of the Ahmedabad Mill owners' Association these advantages are not, however, such as to outweigh the present higher cost of fuel oil.

20. In their oral evidence, the Ahmedabad Millowners' Association made it clear that the initiative in the matter of the proposed conversion did not come from them ; it was a suggestion put to them for consideration by a Department of the Government of India. Their initial reaction was to oppose an obviously uneconomic proposition, but they informed us that provided certain conditions were fulfilled they would not object to a change-over to oil if this would help conserve India's coal resources. The conditions mentioned them are—

(*i*) There should be a guarantee that at all times the price of oil will not be relatively higher than the price of coal delivered at Ahmedabad. Adjustment in freight rates or customs duty should be made if they become necessary to secure this parity.

(*ii*) There should similarly be a guarantee of continued supply of oil at all times.

The oil companies have frankly admitted that it is unlikely that oil could successfully compete with coal in Ahmedabad in the matter of price in a competitive market unless the freight rate or customs duty or both on oil are altered suitably from time to time to correspond with fluctuations in coal prices. As regards assurance of supplies, a guarantee was naturally out of the question for there are world forces which influence the oil industry. Nevertheless, the oil companies thought that a reasonable expectation of continued availability of oil could be entertained ; but if, in an emergency, there was an interruption of supply, re-conversion of the cotton textile mills, and of other consumers also, to coal burning would be a comparatively simple matter. Incidentally the adaptation of boilers to burn furnace oil instead of coal does not present any serious mechanical difficulties. Of the 70 textile mills at Ahmedabad, 3 have already been converted to oil burning and 15 others electrified.

21. These are the facts of the proposal. On merits, we are convinced that its sponsors have proceeded on mistaken assumptions. There is *not* a general shortage of coal resources in India ; large undeveloped deposits exist and even in the older fields a considerable increase of output is possible. What the country suffered from during the war was a shortage of output ; more important still, and in their turn reacting on output, were the very inadequate rail transport facilities. The Indian coal industry can and must grow to much larger proportions, and later in this report we shall make concrete proposals for expansion. For the present, we will only say that it would be most unfortunate if an impression is allowed to gain ground that a shortage of coal resources in India compels important industries to look for other forms of fuel. We would like to refute such an impression.

Again, it is *not* essential that any of the coal required by the Ahmedabad mills should necessarily come from the distant Bengal/Bihar fields. From the millowners' point of view, there is no reason why it should ; they are content and anxious to receive their supplies from the much nearer fields in Central India and the Central Provinces. We see no reason why, with the further development of these fields, all the requirements of the Ahmedabad mills could not be met from these nearer sources.

And, lastly, we fail to see any reason for the complacent thought that oil will provide a more assured source of power to these mills. India is at present producing only small quantities of oil and depends for practically all her requirements on imports. Our supplies of fuel oil are mostly obtained from the Persian Gulf area ; Burma was never a considerable producer of fuel oil and it will be some time, we are informed, before the Netherlands East Indies are again likely to be in a position to resume supplies. Oil is a pawn in international power politics and we think it only prudent to reject the suggestion that India can remain assured at all times of her needs of oil. It would be unwise to allow any vital industry to depend entirely on oil for its motive power. In saying this, we are not ignoring the fact that, in the recent emergency, the Bombay mills continued to work probably more fully than the Ahmedabad section of the industry. The continued availability of furnace oil for the Bombay mills was fortunate ; but it was primarily the consequence of the strength of the United Nations and their control over important oil resources. That the Bombay mills were fortunate on this occasion cannot be made into an argument. We have not overlooked, either, the point that, in the event of an interruptiotn in oil supplies, the mills could change back to coal with comparative ease. But this sounds like special pleading for oil. Our conclusion, therefore, is that a change-over of the Ahmedabad textile mills to oil burning is both unnecessary and undesirable.

22. A matter of some importance relating to the Ahmedabad mills is the possibility of their obtaining power from a large central electricity station instead of from separate generating units. This idea is attractive as likely to result in economy of coal consumption because of the greater efficiency of electricity generation in a large unit. Already, the Ahmedabad Electricity Supply Company have in hand an expansion of their generating capacity to meet the increasing demand from mills and other consumers. We have, however, been informed by the Ahmedabad Millowners' Association that the cost of electricity supplied by the Ahmedabad Electricity Supply Company is relatively high and prevents a more extensive offtake of power by the mills from that source. This is outside our terms of reference and we have therefore not made any investigation into the matter.

23. We have given some thought also to the conversion of industry in certain other areas from coal to oil. In this connection, we would draw particular attention to the two letters dated 19th July 1946 and the 23rd July 1946 from the Burma Shell Oil Storage and Distributing Company of India, indicating the present position in regard to the use of furnace oil and anticipated developments. The opinions we have expressed in regad to the change-over of the Ahmedabad cotton textile mills to oil do not necessarily apply to other cases. If imported oil can, without special favours shown, compete successfully with coal in a market, it may be allowed to do so, within limits. It is clear that in the years before coal production in India grows to the extent desired, the use of substitute fuels, in certain circumstances, will benefit the country by relieving the strain on coal supplies which for a time, may lag

behind demand. We were informed by the North Western Railway that the use of furnace oil in place of coal in railway locomotives does not call for any thing other than comparatively minor mechanical adaptations ; in that event the use of furnace oil by the railways over sections conveniently located in relation to ports of entry and distant from the coalfields need not be discouraged. This would apply to other consumers also who, with relatively minor modifications, could revert to coal burning in the event of an interruption or serious curtailment of oil supplies. In the case of certain industries, such as glass, the use of oil has technical advantages, and we note that some developments in this direction are taking place.

The two letters received from the Burma Shell Oil Storage and Distributing Co. indicate that, in the very near future, certain consumers in Kathiawar, Sind and Southern India will change from coal to oil burning. The total additional oil requirements in Southern India are stated to be 52,000 tons per annum; the Associated Cement Co's. works at Dwarka and the Dalmia Cement Works at Karachi will require about 105,600 tons per annum when they convert to oil. A total of about 300,000 tons of coal will thus be released yearly, perhaps from 1947.

It is also stated that in Southern India a further 205,583 tons of oil per annum may be required by certain existing and new installations. In the Bombay Province, Kathiawar and Sind, the oil companies consider that a conversion to oil to the extent of a minimum additional demand of 158,400 tons of oil per annum is feasible. The effect of these conversions, if they all materialise, would be to withdraw a demand for coal of the order of 700,000 tons per annum.

We realise that the conversion to oil of consumers situated near the seaboard may grow in the years to come mainly on economic grounds, and so long as no special concessions are demanded, we do not think it advisable to interfere, despite our firm conviction that industrial activity within the country should not be made dependent on imported fuel. But being aware of the difficulty of meeting all the demands for coal, we do not suggest any restriction for the present. The result may be that in the next 10 years or so oil may displace nearly 1 million tons of coal.

Domestic Coal Consumption.

24. For its size, India consumes a surprisingly low quantity of coal for domestic purposes. "The World Coal Mining Industry," 1938, gives the following figures of annual consumption in certain other countries :—

	Million tons
Germany	42
U.S.A.	103
Great Britain	36
Italy	0·58
South Africa	1·61
Spain	0·18

Indian consumption is described as " negligible ".

25. For domestic purposes, soft coke is the principal derivative of coal that is used in India, and quantities of steam coal and briquettes are also burnt. The report on the working of the Indian Soft Coke Cess Committee for 1941 gives the following figures of despatches of soft coke from the Bengal/Bihar coalfields from 1917 to 1940 ; these fields constitute the principal sources

of supply but certain proportions of the coal output of the other fields are also used as domestic fuel.

	Tons
1917	225,120
1918	240,269
1919	308,565
1920	181,530
1921	151,417
1922	188,919
1923	220,061
1924	304,745
1925	415,969
1926	515,665
1927	608,612
1928	689,205
1929	754,115
1930	745,564
1931	722,597
1932	756,036
1933	823,073
1934	860,478
1935	888,493
1936	915,719
1937	830,784
1938	889,671
1939	888,982
1940	962,825

The recent average may be taken as 900,000 tons. For the latter years, we might add the following approximate quantities of different types of coal or coal derivatives for arriving at the total coal consumption for domestic purposes :

	Tons
Coal taken away by labourers at collieries (practically all for domestic use)	800,000
Soft coke from other fields.	100,000
Steam coal and briquettes (approximately)	200,000
	1,100,000

The manufacture of about 1 million tons of soft coke requires 1·3 million tons of coal and so the total quantity of coal used for domestic purposes would be about 2·3 million tons per annum. On a production of say 30 million tons of coal per annum, we thus arrive at a figure nearly 7.5% as the coal appropriated for domestic purposes ; the figure is not negligible but is nevertheless low. The bulk of the consumption is, however, in Bengal and Bihar as will appear from the following table of soft coke carried by the various railways from the Bengal/ Bihar fields.

Statement Showing Quantity Of Soft Coke Carried By Various Railways During The Years Ending June 1938, 1939 And 1940.

Name of Railway	Year ending June 1938	June 1939	June 1940
	Tons.	Tons.	Tons.
A. B. Railway	20,603	24,634	27,501
B. N. Railway	52,696	60,310	64,425
B. & N. W. Railway	827	893	780
B. B. & C. I. Railway	13,952	12,350	10,631
B. D. Railway	565	663	699
Bhavnagar S. Railway	295	117	40
Barsi Light Railway	36	—	—
G. I. P. Railway	9,443	9,565	10,272
Jodhpur Railway	1,372	1,254	1,033
Jamnagar & Dwarka Railway	—	16	—
M. & S. M. Railway	1,437	1,876	1,859
H. A. Light Railway	3,311	4,916	4,138
H. S. Light Railway	248	202	59
B. B. Light Railway	404	581	227
H. E. H. Nizam's State Rly.	67	37	53
R. & K. Railway	1,620	1,578	1,406
S. I. Railway.	—	35	102
N. W. Railway	72,968	73,124	71,256
E. B. Railway	198,431	212,104	500,363
E. I. Railway	488,492	500,082	235,292
	866,767	904,337	930,136

The A. B. Rly., E. I. Rly., B. N. Rly., and E. B. Rly. in 1940 carried 827,581 tons out of the total of 930,136 tons despatched.

26. The principal reasons for this comparatively low consumption are—

(1) the ready availability of wood fuel and dung cakes all over the country,
(2) natural prejudice against changing over to a new fuel,
(3) the poor quality of the soft coke supplied by many collieries, and
(4) the relatively high cost of soft coke in the more distant areas, mainly due to prohibitive railway freight rates.

The quantity of wood fuel (including charcoal) and dung cakes consumed all over the country must be colossal and we have been unable to find reliable data on which to base an estimate. But the disastrous consequences of cutting down forests for fuel purposes and the denial of dung as manure for agriculture have been stressed often and vigorously. The public mind is yet slow in awakening to the need for a radical change in the present situation ; and, in our opinion, a solution lies only in the more widespread use of coal and soft coke for domestic purposes.

The Indian Soft Coke Cess Act was enacted in 1929. The object of the Act is " to provide for the creation of a fund for the promotion of the interests of the soft coke industry in the Provinces of Bengal and Bihar and Orissa ". A Soft Coke Cess Committee was formed and was to be financed from the proceeds of a cess of 2 annas per ton of soft coke despatched by rail from Bengal and Bihar and Orissa. The fund was to be " applied to meeting the expenses of the Committee and the cost of such measures as it may consider advisable to take for promoting the sale and improving the methods of manufacture of soft coke ".

The Act came into force in June 1930 and the Soft Coke Cess Committee have been in operation since. In war-time, their activities have been restricted, but in 1940 the Committee were operating in the Punjab, the United Provinces, Delhi, Bombay, Orissa and the east coast section of the Bengal Nagpur Railway. In the attempts to encourage the use of soft coke and to secure an improvement in its quality, the Committee have taken the following main steps :—

(*i*) intensive propaganda through house to house visits, practical demonstrations, the distribution of soft coke free to new consumers, advertisements and pictorial posters and participations in exhibitions, *melas*, etc.,

(*ii*) monetary concessions to dealers in certain places in the shape of bonuses on sales and the payment of depot rents,

(*iii*) experiments and research on the manufacture of soft coke by improved methods,

(*iv*) registration of collieries manufacturing soft coke and dealers and depot holders—in 1941 there were over 165 registered collieries and

(*v*) inspection on behalf of consumers of the loading of soft coke by collieries.

We think it worthwhile, also, to reproduce the following extract from the Soft Coke Cess Committee's report for the year 1940-41 :—

" The introduction of soft coke as a substitute for wood which has been used in various parts of the country from time immemorial is no easy task and in certain areas the Committee have experienced great difficulty in combating the erroneous idea that food cooked on a soft coke fire is injurious to health.

* * * * *

" Smoke is a great danger to public health, especially in cities and towns as may be seen from the following passages in a report of the Bengal Smoke Nuisances Commission—

' Medical Authorities state that in large congested towns the death rate from breathing organ diseases is a fair index of smoke pollution of the air.

Smoke poisons plants and food supplies, corrodes buildings, lowers the public vitality, facilitates the contraction of diseases and cuts off the sun's health-giving ultra-violet rays.'

" The Special Committee appointed by the Ahmedabad Municipality in January 1931 to enquire into the Smoke Nuisance question requested the Municipality to urge the public to make use of soft coke which gives off little smoke. It was pointed out that besides being cheap in price, the heat it gives out is much greater than in the case of firewood or charcoal and it lasts longer."

27. In spite of all the action taken, the increase in the consumption of soft coke is disappointing for the reasons mentioned in para. 26. Natural prejudice can be removed only by publicity, in which the help and co-operation of Provincial Governments, local bodies and other public institutions must be enlisted.

As to an improvement in the quality of soft coke, the initiative must come primarily from the collieries, which must realise that the receipt of active assistance from Government imposes on them certain responsibilities towards their customers. With India's unlimited resources of inferior coals, the potentialities of the soft coke industry are vast, but it is essential that the quality

of the soft coke produced should create confidence. Equally, a Government interested in securing an increase in soft coke consumption must be prepared to regulate its manufacture in the interests of the consumers more efficiently than heretofore. On this question and the related one of offering soft coke at an attractive price we shall have more to say later, but here we would emphasise that it is essential to take effective measures for spreading the use of soft coke more widely in the country. Such use can provide a continuing economic existence for collieries producing principally the inferior grades of coal.

28. We have shown that about 1·3 million tons of coal is now being used for the manufacture of soft coke. For the purposes of planning, we think the country should place before itself a target of 3 million tons of coal per annum for this purpose at the end of the next ten years. The natural fields for the increased use of soft coke outside Bengal and Bihar are the United Provinces, the Punjab and the Central Provinces and we are sanguine that these alone can absorb the increased quantity. It is, of course, not sufficient to manufacture the soft coke ; the railways must move what is produced and our plans must provide necessary transport facilities, in addition to other direct methods for stimulating the use of soft coke.

Conclusions And Recommendations

(1) In war time, even with the control over distribution, considerable quantities of good coking coal went to the railways, bunkers, exports, and a number of consumers other than iron and steel works and coke ovens.

(2) Our estimate of coal requirements from 1956 is about 41 million tons, per annum ; but there are certain factors which will vary the requirements.

(3) We do not favour the dependence of vital industries on imported oil and **advise against the conversion of the Ahmedabad cotton textile mills to oil. Adequate quantities of coal to meet all internal requirements can and must be made available.** Nevertheless, for mainly economic reasons, oil may have replaced nearly one million tons of coal in certain areas by 1956.

(4) **It is essential to increase the domestic consumption of soft coke and for this purpose we suggest a target of 3 million tons of coal per annum from 1956.**

CHAPTER V

COAL EXPORT POLICY

The coal handled by the Port of Calcutta can be divided into three broad categories, *viz.*—

(*i*) bunker coal,
(*ii*) export coal, and
(*iii*) coastwise coal (*i.e.*, coal shipped to other Indian ports).

It is usual to consider the export and bunker requirements of coal together and for that purpose we give in Appendix X a table showing exports of coal to foreign countries and coal for bunker purposes for the years 1920 to 1942.

Bunker Requirements.

2. We propose first to deal with the question of bunkers, as it is the simpler of the two. Nowhere has it been seriously suggested that any restriction should be placed on the supply of coal for bunkering purposes at Indian ports, though one witness proposed that these supplies might be limited to the quantities necessary to enable a ship to reach the next port of call outside India. This, however, is an impracticable suggestion, in our opinion. In so far as the ports of call outside India towards the east are concerned, they depend to an appreciable extent on supplies of coal received from this country. In so far as voyages west-wards are concerned, this is substantially the practice now being followed by ships. A restrictive measure of this nature will thus not produce any substantial economies and is likely to create a bad psychological effect. Without international trade, a country like India cannot prosper. India has practically no shipping of her own and foreign ships will be reluctant to call at Indian ports unless bunkering facilities are freely available. For this reason, any restrictions on the supply of bunker coal must be discountenanced. This apart, such supplies from India are not likely to be large. The maximum hitherto has been about 1 million tons per annum, but the average lately has been in the neighbourhood of 600,000 to 700,000 tons per annum. It is also doubtful whether the requirements in the future are likely to remain even at this level. The modern tendency is towards oil-burning ships and at Bombay we were told that the quantity of coal bunkered lately has shown a decline, mainly owing to this tendency. But whatever the requirements be, they must, in our opinion be met in full. We are not unaware of the fact that bunker coal is necessarily high grade coal and that our resources of such coal are not over-plentiful. But the bunker requirements are so small and the general case for meeting them in full so strong that the balance of advantage lies in shouldering this responsibility.

Review Of The Export Trade.

3. The question of exports of coal to foreign countries is more complicated and has a longer history. There have been wide fluctuations, exports in the years from 1922-25 being the lowest. Two factors were probably responsible—

(*i*) a temporary ban on exports imposed by the Government of India with the object of meeting internal coal requirements to the maximum extent possible, and

(*ii*) the decline in the reputation of Indian coal in foreign countries due to a steady deterioration in the quality of the coal supplied.

Markets which had been fed from Indian sources were, during this period, captured by South Africa and Japan. This loss of foreign markets, occurring in the midst of a general fall in internal coal requirements in the post-war years, created so serious a situation that the Government of India, in 1924, appointed the Indian Coal Committee to report on the measures to be taken " to stimulate export of suitable coal from Calcutta to Indian and foreign ports ". The Committee were of the opinion that it would be very difficult for individual exporters of coal to re-establish themselves in overseas markets owing to the bad repute into which Indian coal had fallen. They, therefore, recommended the immediate creation of a Grading Board whose duties would be to grade collieries which produced coal for export and to arrange for the issue of a certificate for each consignment of coal exported. A grading list would be published by the Grading Board, as soon as possible, classifying the different collieries and seams and giving the analysis of their coal. The Committee further recommended that on certified coal the railway freight rebate of 25% should be enhanced to 37½% and the river dues of the Calcutta Port Commissioners reduced by 4 annas per ton. The collieries concerned would be responsible for the payment of the cost of analysis for the purposes of grading as also a fee on the coal inspected for shipment.

These recommendations were accepted and implemented by Government and their effects are noticeable from the year 1926. There was, however, a decline again from 1931 due mainly to world factors. In spite of the low price of Indian coal, it could not compete successfully with South African coal in particular, and the Government of India, therefore, decided in 1936 to assist the export trade by a further rebate of 8 annas per ton on certified export coal. This concession tilted the price balance in favour of Indian coal and an improvement in exports is noticeable from 1937. All the above concessions are still in force.

4. The emphasis in India from 1925 onwards has been on a stimulation of the Indian coal export trade. But in the recent war, and especially in its later years, the internal requirements of coal became so important that a policy of restricting exports to the essential minimum had to be enforced. In a situation in which internal requirements were not being fully met, the appropriateness of exporting coal practically all of it of superior quality, began to be more actively debated upon. It was suggested, for example, that the emphasis laid earlier on maintaining India's coal export trade had lost its significance in the new context of increased internal requirements and inadequate supplies to meet them. On a related matter, the Coal Mining Committee, 1937, had stated that the undue importance attached to the export trade tended to exhaust Indian resources of good quality coal more rapidly, as it encouraged sectional grading and working of seams.

5. In relation to exports, therefore, we have had to consider the following questions :—

(*i*) to what extent have the setting up of the Coal Grading Board and the grant of various concessions assisted in reviving the export trade ;

(*ii*) were the Coal Mining Committee's criticisms of the working of the Coal Grading Act justified ;

(*iii*) what should be India's future policy towards the coal export trade ; and

(*iv*) subject to the conclusions on (*iii*), is it necessary to continue the monetary concessions that have attached hitherto to export coal ?

Effects Of The Coal Grading Board Act.

6. We can dismiss (*i*) above briefly, for the figures of coal exports speak for themselves. There is no doubt that the creation of the Coal Grading Board and the certificates issued by the Board in respect of particular consignments brought about a revival of confidence in Indian coals. The monetary concessions granted gave Indian coals a slight price advantage in certain markets and the further rebate of 8 annas per ton given in 1936 proved decisive in securing for India certain valued overseas contracts.

7. The Coal Mining Committee, 1937, have dealt with the operations of the Indian Coal Grading Board Act at length in paragraphs 147 and 160 of their report. Briefly, the Committee considered that the Act provided a direct incentive to collieries to work seams in sections. Where a seam would be Grade I quality as a whole, it had been split up by sampling into a section of Selected Grade coal and an ungraded section. Only the Selected Grade section is then extracted in the first workings. When depillaring begins, the comparatively inferior section left in the roof or the floor must either be recovered or left behind and lost. In practice, there had been no recovery, partly because the ungraded section was comparatively unprofitable or not profitable at all (specially so in the years from 1930 to 1936) and partly because the Grading Board do not allow ungraded coal to be extracted at the same time as graded coal, unless the Grading Certificate is surrendered. In the result, the un-wanted section is crushed in the goaf by the falling roof and this not only causes a waste of coal but also enhances the risk of spontaneous combustion. The Committee observed that all this was happening in the interests of an almost insignificant export trade and concluded that the only satisfactory solution was to stop the grading of sections of seams and to cancel existing certificates of such grading. If any colliery applied for a fresh certificate for a seam as a whole, this should be granted without charge. The result of this recommendation would be that, so far as the export trade is concerned, only seams of more or less uniform quality and capable of a single grading throughout could, in practice, be exported under certificates of shipment. This was no cause for concern, as the bulk of the coal exported under certificates did in fact come from such seams. As a corollary, the export of ungraded coals should be prohibited, for grading alone can provide the desired assurance in respect of quality.

The Coal Mining Committee recognised that the stopping of section grading for export purposes would not, however, by itself, stop section working for the internal trade ; and they thought it desirable to regulate section working in the interests of conservation and safety and to adopt necessary steps towards this end.

8. The comments of the Coal Mining Committee on the consequences of sectional grading were obviously based on the history of the coal industry in the immediately preceding years. Mention has been made elsewhere of the factors that were at work in this period leading to the "slaughter" exploitation of high grade coal. But there is another view point. No objection can be raised, we think, to a reasonable direction of the use of coal so that the country derives the maximum benefit from

its reserves. Scientific utilisation must, of course, be preceded by a more extensive knowledge of the qualities of Indian coal and by a study of consumer requirements. These are large questions to which we shall revert later; for the present, we may say that, for the purposes of scientific utilisation, the grading and working of seams in sections of uniform quality may become essential in certain cases. The objections of the Coal Mining Committee, 1937, to such sectional grading, on the score of the destruction of coal assets it has caused in the past, would no longer be valid if suitable measures are taken to ensure that the coal left in the seam is not rendered unworkable; and we later make recommendations to that effect. Incidentally, sectional working is inevitable in thick seams and, in fact, compulsory under the Indian Coal Mines Regulations.

A cogent point, which has been put forward by one or two witnesses, is that, with the advance of washing as a means of de-ashing coal, the practice of grading sections of seams would become antiquated. Variations in the different sections of a seam probably relate more to ash content than to inherent quality and if washing can bring about uniformity in ash content practically all the coal from a seam might become one grade. It is urged, therefore, that the grading of seams or sections *in situ* should be abandoned, that there should be a wide-spread movement towards the washing of coal and that grading should apply to the washed product. These are no doubt sound proposals which may be kept in view as the ultimate objective; but the progress of washing is likely to be slow in this country and, initially, our efforts must be directed to washing for certain specific purposes rather than for general consumer use. Once washing is common, the grading of seams *in situ* may become outmoded and could be abandoned. But, for the intervening period, there can be no escape from grading or rather assessment of quality on approximate analysis, if we desire to secure a proper use of coal resources.

9. The Coal Mining Committee, 1937, have referred also to the need for regulating sectional working, in the interests of conservation, for the internal trade. We shall deal with this in later chapters.

Future Policy In Regard To Exports.

10. On the question of India's future policy towards the coal export trade, conflicting views have been urged before us. The case for banning exports is based on the grounds that export requirements are generally of high grade coal of which our resources are limited; that the production of coal in India is insufficient to meet the internal demand; and that it would be wrong to starve our industries to feed overseas consumers. In particular, it is urged that it would be suicidal to continue to export our extremely limited resources of metallurgical coal and that even as regards non-coking coals, the qualities now being demanded by the export trade are well-suited for the development of chemical industries in the country. The case for continuing exports has been stated as follows by the three principal coal mining Associations of Bengal and Bihar:

"There are certain countries in close proximity to India which have practically no coal resources of their own and are therefore, India's natural markets, *e.g.*, Burma, Ceylon, and Malaya. Any restriction on the export of coal from India to these countries might, we think, create bad feeling and result in repercussions in the shape of discriminatory action against other Indian commodities, or restriction on exports from these countries to India.

"Coal is a bulk cargo and the knowledge that it is possible to get coal cargoes outward from Calcutta undoubtedly stimulates the flow of tramp tonnage into Calcutta which is a good thing for trade in general and for special imports such as rice from Burma in particular.

"We think that this aspect is important in view of the fact that India is a large importer of food.

"After the last war there was doubt as to whether India was producing sufficient coal for her own requirements and, therefore, Government stopped the export of coal; when export again became necessary to assist the coal trade, it took a considerable time to build up the export markets again. It would be a pity for India now to do the same as was done previously in similar circumstances and which proved, in course of time, to have been a mistake."

11. We do not accept either view in its entirety. We must abandon the attitude that it is essential at all costs to encourage and maintain the export trade. On the other hand, there are certain adjoining countries whose coal resources are negligible and whose geographical situation in relation to, and past associations with India make this country a natural source of supply; likewise these countries are India's natural markets. India also must look to some of these countries for supplies of certain important commodities and thus the maintenance of friendly relations with them is of mutual benefit. Our policy as to coal exports should, therefore, be based not on the consideration that India is anxious to develop her export market, but that she is prepared, subject to certain conditions, to undertake the responsibility of catering for the needs of certain neighbouring countries (*viz.*, Burma, Ceylon and the Straits Settlements) for whom she constitutes a natural source of supply. These conditions are that the requirements of India must generally receive precedence and that exports may be permitted provided internal requirements are not endangered; that it may be necessary to ban the export of certain types of coal, of which our resources are extremely limited; and that any responsibility we may be willing to shoulder in this matter would not be an unconditional commitment, but would be dependent on reciprocal agreements to be settled by negotiation.

12. It is obviously also necessary that some measure of control should be exercised over the annual exports to the three countries mentioned-obvious because India's resources and ability to export are limited. A suitable guide for determining the quantities that may be exported would, in our opinion, be the exports to these countries over a period of years before the recent war, modified by any other considerations that may exist. The following table gives these details for the year 1926 to 1939; figures for Burma are shown separately as from April 1937.

Year	Burma	Ceylon	Straits Settlements
1926		243,263	117,469
1927		341,352	147,405
1928		352,602	73,389
1929		366,926	75,770
1930		282,590	26,367
1931		282,289	30,246

Year	Burma	Ceylon	Straits Settlements
1932		190,834	13,357
1933		229,122	8,655
1934		228,559	35,647
1935		146,232	16,850
1936		149,114	16,928
1937	*394,138	379,484	44,984
1938	614,856	253,686	7,508
1939	474,882	353,769	105,098

*for 9 months only from April 1937

The approximate annual average for each country is as follows :—

	Tons.
Burma	539,600
Ceylon	271,400
Straits Settlements	51,400
Total	862,400

In the first four months of 1946, India supplied about 88,000 tons of coal to Burma through the Army which then controlled distribution in that country. This, however, was the minimum essential demand at that time and more is certain to be required with the restoration of normal conditions. It would not be wrong to estimate these eventual requirements at about 500,000 tons per annum but for the next year or two, for reasons which are obvious, the export of about 300,000 tons per annum may probably suffice. After full consideration, we make the following recommendations as regards the limit of exports :

	Tons per annum.
Burma	500,000
Ceylon	275,000
Straits Settlements	50,000
	825,000

We would not totally prohibit exports to these countries in excess of these figures, but consider that such excess exports should be governed by the principles laid down in our next paragraph. We realise also that any restriction on free trade of the nature we envisage necessitates machinery for its enforcement, but this is a matter for arrangement between the Governments concerned, in which, doubtless, any views which the coal exporters and importers may wish to put forward as to the *modus operandi* will receive full consideration.

13. Though we are opposed to exports of coal from India to countries other than the three mentioned, we would not totally exclude the despatch of special consignments, under licence, to consumers in other countries. A strong case would, however, have to be made out to the Government of India for obtaining such licences.

14. We shall consider in a later chapter the question as to whether it is desirable to prohibit the export of certain types of coal.

Concessions Attaching to Export Coal.

15. The statement below shows the concessions attaching to coal coming under the different categories :

	Railway rebate	Port dues rebate.
Export Coal—		
(Graded) . . .	.37½ on freight *plus* 8-0 per ton } and refund of 20 per cent. surcharge.	4 annas per ton.
(Ungraded) . .	.25 percent on freigt } and refund of 20 per cent. surcharge.	*Nil.*
Bunker coal—		
(Graded)	No rebate	*Nil.*
(Ungraded) . . .	No refund of any surcharge.	*Nil.*
Coastwise Coal—		
(Graded) . .	37½ per cent on freight. } and refund of 20 per cent. surcharge	4 annas per ton
(Ungraded) . . .	. 25 per cent on freight. } and refund of 20 per cent. surcharge	*Nil.*

We have already shown that the conditions obtaining now are materially different from those that existed when the Indian Coal Committee, 1925, made their recommendations or even before the recent war. The country is suffering from an acute shortage of coal. The internal demand will keep on increasing with greater industrialisation and, so far as we can see, all the coal produced of the requisite quality is likely to find a ready market in the country, if transport is available. The need for the maintenance of an export market is therefore of no immediate consequence. We have explained why, nevertheless, we may be justified in exporting to certain adjoining countries and why in our own interest we deem it necessary to provide all the coal required for bunkering purposes. But in the present circumstances of world wide scarcity of coal and of high prices, the justification for continuing *any* concessions in respect of coal consigned to other countries does not exist. The reasons which led to the grant of special concessions in respect of export coal no longer prevail and the concessions should, therefore, be withdrawn forthwith.

16. No concessions attach to bunker coal at the port of Calcutta at present and the position should continue.

Coastwise Coal.

17. We come now to the last category of coal shipped from Calcutta, *viz.*, coastwise coal which is coal intended mainly for consumption in the country but carried to other Indian ports by sea. A considerable quantity of coal has always been carried to different Indian ports from Calcutta. Before the war, the rail-cum-sea freights to certain Indian ports from Calcutta were more favourable than the railway freights from the coalfields. The

Statement below gives the approximate comparative pre-war and later figures for graded coal :

	1939 (Up to August).		1942	
	Railway freight.	Rail-cum-sea freight	Rly. freight.	Rail-cum-sea freight
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
Madras	12 7 0	7 14 0	13 12 0	22 3 9
Bomaby	12 6 0	9 13 0	14 14 0	32 3 9
Karachi	15 3 6	9 14 0	17 1 0	37 3 9

NOTES—

1. Railway freights shown are averages of Raniganj and Jharia rates.
2. The Rail-cum-sea rates include net average railway freights to Calcutta in 1939 and 1942 respectively and net Calcutta Port dues.
3. Present sea freights are substantially the same as in 1942.

The war saw not only a considerable diminution in the number of ships available for carrying coal but also a tremendous rise in freight and insurance charges. What the effect has been can be seen by comparing the cost[1] per ton of coal delivered in the Port Trust area at Bombay by the all-rail route and by the rail-cum-sea route :

All Rail-Route	Rs. A. P.
Cost of coal f.o.r. colliery	13 5 0
Railway freight	12 6 0
Surcharge on Rly. freight at 20 per cent	2 8 0
Labour Cess	0 4 0
Coal production cess	1 4 0
Stowing cess and Mines Rescue cess	0 2 2½
Bombay Port Trust Rly. siding fee	0 3 0
Labour for unloading wagon ex plot	1 5 0
ex plot cost	31 5 2½

Rail-Cum-Sea Route	Rs. A. P.
Cost f.o.b. Calcutta	20 12 0
Freight	30 0 0
Insurance	0 7 0
Shortage	0 6 0
Lighterage & Landing	3 4 0
ex plot cost	54 13 0

As it is not possible for the railways to carry all the coal required by consumers in distant coastal towns certain consumers have been compelled to obtain their supplies by sea despite the considerable difference in cost.

18. This situation is unsatisfactory, and we have given considerable thought as to whether it can be remedied. The railways cannot, certainly at present, carry all the coal to the absolute exclusion of

[1]Figures supplied by the Bombay Coal Allocation Committee.

the coastwise trade. Sea freights unfortunately are not a subject for easy manipulation since they are primarily influenced by the global relationship of supply to demand and the margin between present and pre-war freights is so great that it is impossible for us even to guess when, or if indeed ever, it will again be possible for coastwise coal to compete with coal by the all-rail route. We considered the suitability of Government subsidising the coastwise trade in coal, but had no hesitation in rejecting the idea, not only because of the inherent demerits of such a policy but also because so much coastwise coal is subsequently re-shipped as bunkers that the proposal virtually amounts to the Government of India paying a part of the cost of bunkers in, for example, Bombay, to benefit ship-owners whose high freight rates are themselves the cause of the difficulty. We also discussed the feasibility of the railways acquiring and operating a fleet of colliers as an ancillary service ; but while the proposal may have some merit in the present circumstances, we do not think it can be of any great immediate practical importance.

We feel therefore that the best solution we can put forward is that all coal for bunkers and coal for the railways in Madras, Bombay and Karachi, so long as transport is short, should continue to be carried by sea and that the railways should endeavour to carry all coal for shore industries. We believe that this is substantially the practice now in respect of Bombay and Karachi, and that additional effort by the railways will really only be necessary in the case of traffic *via* Waltair ; we hope, therefore, that the proposal will prove practicable and that the office of the Coal Commissioner will be able to evolve a formula for the individual ports which will ensure that rail-borne coal is not re-shipped as bunkers. We regret that our proposal does not do anything to help the railways or steamship companies at these ports, but if the railways' carrying capacity had been greater or sea freights lower the situation would not have arisen. In making our suggestion that coal for shore industries should not be carried coastwise by sea, we have taken note of the fact that latterly the bulk of the coastwise shipments have been for the railways and bunkers, as will appear from the following statement:

Year	Railways Tons	Industries Tons	Bunkers Tons	Total Tons
1945 . . .	402,168	146,892	626,196	1,175,256
1946 (first four months) .	117,118	49,959	342,384	509,464

To divert the present comparatively small movements for industrial requirements to the rail route should not be difficult.

We do not feel in a position to make a similar recommendation regarding the smaller ports such as Cochin or the Kathiawar ports, but where similar problems exist and a similar solution is feasible, we hope that it may be adopted.

19. We would like to record the view that the coastwise coal trade is of great importance to the country's economy, not only to save very long and unprofitable haulages by rail but also because coal shipments from Calcutta constitute useful bulk cargo for a coastal merchant marine. It is in the long-term interests of the railways and the country to rehabilitate the coastwise trade as soon as possible, and for this reason we recommend that the existing concessions in respect of rail freight and port dues should be continued, even though the principal immediate benefit will be to subsidise bunkers at Indian ports other than Calcutta.

We were told at Bombay by the shipping companies that they regard coal cargoes as a very considerable source of income, and we trust that they will bear in mind the advisability of keeping this business alive. We have been informed that there is a very good case for an immediate reduction in the sea freights on coal by about 25 per cent., but in our discussions with them at Bombay the shipping companies did not show aliveness to the danger to themselves of the present situation.

20. We have one further point to raise. Special rebates of railway freight have hitherto been given to shipments of graded coal. This has been a measure tc rehabilitate the reputation of Indian coal by examination and certification of cargoes by the Coal Grading Board. We feel this measure has served a useful purpose, and though we have suggested that no rebates should be given on export coal, and the financial inducement to obtain a Grading Board certificate thus disappears, we trust that exporters, in their own interests, will continue to cover cargoes of coal for export with a Grading Board certificate, as heretofore.

Conclusions and Recommendations

(1) **There should be no quantitative restrictions on the supply of coal for bunker purposes**; the requirements are small and the general case for meeting them in full very strong.

(2) The comments of the Coal Mining Committee, 1937, on sectional grading as arising out of the Coal Grading Board Act are not valid in the light of our recommendations on conservation.

(3) The emphasis placed on the coal export trade in the past has no longer any validity. **Exports may normally be permitted only to Burma, Ceylon and the Straits Settlements, subject to certain limits; exports to other countries may be permitted only in special circumstances.**

(4) **The concessions that have so far attached to export coal should be withdrawn forthwih. The concessions on coastwise coal should continue.**

(5) **As far as possible, coal for internal requirements, other than those of the railways at certain places, should not be sent coastwise in the present circumstances of high sea freight rates. Such shipments should be confined to all coal for bunkers and coal for the railways in Madras, Bombay and Karachi so long as transport is short.**

CHAPTER VI

COAL AS A SOURCE OF ELECTRIC POWER

General.

Coal is to-day the most important source of industrial power in India. A proportion of it is used as a raw material for making metallurgical coke or in rotary kilns for the burning of cement clinker; and the remainder is burnt raw as fuel, principally for steam raising purposes in various industries, on the railways and in ships. It has been often urged that the use of coal for steam raising constitutes a most wasteful method of utilisation and that where other considerations, which of course exist in industrial use, permit, the power latent in coal should be more efficiently utilised through the thermal generation of electricity.

The availability of suitable power, in its turn, reacts on the production of coal. Power is essential for the efficient working of large units of production, particularly where there is a large degree of mechanisation, since, beyond a limit, steam power fails to perform efficiently the tasks demanded of it and a keener demand for electrical power inevitably arises. In times of high prices of coal, the more efficient conversion of coal into power, which thermal electricty secures, also confers on it decided economic advantages over the burning of coal for steam raising. All these factors are becoming increasingly important in the Indian coal-mining industry; and the presence of an intensified demand for electric power, with its repercussions on the further development of production, necessitates urgent consideration of the power position in the coal-mining industry. Our views on this follow; and later we shall turn to certain aspects of the more economical use of coal for generating power for industrial purposes.

History Of Electricity Development In The Coalfields.

2. As long ago as 1920, attention was drawn by Mr. Treharne Rees to the need for making a more plentiful supply of electricity available in the coalfields. Over 10% of the annual output of coal in the Jharia and Raniganj fields was then being consumed by collieries for steam raising purposes. Mr. Rees pointed out that this high rate of consumption was probably due to the excessive number of separate steam raising plants of wasteful design and the comparatively small extent to which electricity was being applied in and around the mines. He noted that a more general use of electricity both for winding, hauling and pumping and for the other purposes for which steam was being used would probably result in a saving of 50% of the coal which was being burnt in steam boilers. Mr. Rees accordingly advised that steps should be taken to secure the more wide-spread adoption of electricity in coal mines and that, for this purpose, power stations should be erected at suitable centres. These stations should be equipped on a large scale to centralise the work as far as economically possible.

3. The Coalfields' committe, 1920, dealing with Mr. Rees'recommendations on this subject, took what now appears to be a rather complacent view. They pointed out that the larger collieries were already taking steps " to provide for their own electrical salvation." They thought, too, that the medium sized collieries could hardly afford individual power stations. Moreover, the disposal or transport of the small coal or slack being used by collieries in boilers seemed difficult and the Committee thought it possible that " under existing conditions, even the extravagant or careless use of such small caol or slack in the boilers is cheaper than electric power would be." About

the same time, certain negotiations were afoot for the establishment of a public supply company in Bengal to serve the coalfields. In the light of these various reasons, the Committee reached the conclusion that an all-embracing scheme for the provision of electricity to the coalfields, sponsored or undertaken by Government, was not necessary and that the "whole question of electrical development should be left to private enterprise without compulsion of any sort." As regards the small collieries, the Committee felt that it would be idle to suggest a switch-over to electricity ; many had not even reached the stage of steam power and those that had, if compelled to electricity, would find it impossible to dispose of their steam plants, except at very great loss.

Subsequent experience has shown that the Coalfields' Committee were mistaken in their conclusions. Central generating stations in the coalfields would have conferred decided economic advantages in many respects and there has been increasing evidence of the preference of collieries for electricity as a source of power.

4. The earliest official records available show that in the year 1924 there were 99 collieries using electricity as follows :—

Bengal	39
Bihar	56
Central Provinces	3
Assam	1

There were no public supply companies in the coalfields at that time and electricity was obtained from power stations installed by collieries or groups of collieries mainly for their own requirements. However, the Dishergarh Power Supply Co. and the Sijua (Jherriah) Electric Supply Co., Ltd., had been permitted by the respective Provincial Governments under Section 28 of the Indian Electricity Act, 1910, to supply electricity to certain specified collieries. It was only between 1932 and 1935 that public supply companies began to function in the Raniganj and Jharia coalfields. The Dishergarh Power Supply Co. was granted a licence by the Government of Bengal in 1932 and by the Government of Bihar in 1934 ; the Associated Power Co. Ltd., and the Sijua (Jherriah) Electric Supply Co., Ltd., were granted licences in 1934 and 1935 respectively. In addition, the Associated Power Co., Ltd., with its power station at Mohuda in the Jharia coalfield, was permitted, under Section 28 of the Indian Electricity Act, to supply electrical energy to specified collieries. The way was now open for a more general use of electrical energy and, by 1944, 55 collieries in Bengal and 79 collieries in Bihar were using electricity. Similarly, the number of electrified collieries in the Central Provinces and Assam rose from a total of 4 in 1924 to 15 in 1944.

Present Position Of Electricity Supply.

5. The present position as regards the supply of electrical energy in the coal fields is briefly as follows :—

Bengal.

In addition to the two licensed undertakings, *viz.*, the Dishergarh Power Supply Co. and the Associated Power Co., Ltd., there are about 12 power stations in the collieries or connected with collieries, with generating capacity varying from 50 K.W. to 2,500 K.W. The existing generating capacity or the two public companies is 16,500 K.W. and the maximum demand

on these in 1945 was estimated at 10,500 K.W. Extensions now proposed, will raise the generating capacity to 20,500 K.W. in 1947 but the estimated demand in 1948 would be about 16,500 K.W. under existing conditions. The total capacity of the private sets is not readily available.

Bihar.

(*i*) *Jharia Coalfield.*—The Sijua (Jherriah) Electric Supply Co., Ltd. is the only licensed undertaking in this area for the general supply of electricity to consumers within its area of supply. Its present capacity is limited to 12,000 K.W. as against the demand in 1945 of 10,300 K.W. An additional 4,000 K.W. of capacity will be installed by 1947, but the demand in 1949 is likely to be 16,000 K.W. The power station at Mohuda of the Associated Power Co. Ltd., as already mentioned, also supplies energy to a few specified collieries and the Dishergarh Power Supply Co., located in Bengal, caters for a number of collieries in the portion of the Raniganj field in Bihar. There are besides some 10 power stations belonging to colliery companies and, of these, four, *viz.*, those at Jamadoba, Bhowra, Hurriladih and Kendwadih, have installed generating capacity of from 2,000 K.W. to 8,000 K.W. The total capacity of these private plants is about 23,500 K.W. but arragnements for increasing this by 5,000 K.W. are in hand.

(*ii*) *Bokaro, Karanpura, and Giridih coalfields.*—The railway collieries in the Bokaro, Karanpura and Giridih fields have their own power stations but they supply power to a few other private consumers also. The power stations concerned are the Kargali Power House in the Bokaro field, the Argada and Bhurkunda Power Houses in the Karanpura field, and the Giridih Colliery Power House. Existing capacity in these fields is 9,350 K W., and additional plants to generate 4,500 K.W. are being installed.

The Central Provinces

The two power stations of Messrs. Shaw Wallace & Co., one at Barkui and another at Datla (total generating capacity 1,250 K.W.), now operating under Section 28 of the Indian Electricity Act, 1910, exist mainly for the collieries belonging to Messrs. Shaw Wallace & Co. The collieries belonging to the Ballarpur Collieries Co. are supplied with electrical energy from their own power house (generating capacity 600 K.W.).

Assam.

The collieries of Messrs. Assam Railways & Trading Co. are supplied with electricity from their own power stations.

Central India.

The collieries operating in the Rewa and Korea States are mostly electrified with their own generating plants. Mention may be made of Jhagrakhand, Chirimiri, Kurasia and Burhar collieries.

Other Areas.

The collieries in the Hyderabad and Talcher States work on electricity as also the Makerwal colliery in the Punjab.

Present Requirements of Electricity in the Coalfields.

6. In recent times and, in particular, during the recent war years, the demand for electricity from collieries has risen on account of the very considerably increased requirements of coal. Factors such as the increased use of machinery, workings at greater depths and the requirements of sand stowing are all responsible in varying degrees. The advantages of electric power, economic and otherwise, are also being more fully realised as the limitations of steam power are brought home.

7. Some time back, a survey of electricity requirements in the various coalfields was undertaken by the Coal Commissioner in co-operation with the Electrical Commissioner with the Government of India but the survey did not take into account any large-scale development of production or the extension of sand stowing. Appendix XI is a statement showing the results of this survey and the extensions projected or in hand designed to meet the present unsatisfied demand.

The extensions proposed are expected to be completed by 1947 and it will be noticed that a total of nearly 18,500 K.W. turbo-alternator capacity is being installed by various colliery power stations and by the licensed public electricity undertakings in the coalfields. By 1948, the Fertiliser Factory power station at Sindri is likely to be commissioned and a firm 15,000 K.W. of generating capacity from this station is reserved for the Bihar Government electric grid. The power position in the Jharia field is thus likely to be eased during the next two or three years, and, with the completion of the Fertiliser Factory, the bulk of the demand from collieries for electrical energy on the present basis will probably be met.

There are, however, one or two comments to be made regarding the interim position. The extensions proposed in the public supply companies amount to an additional 9,000 K.W. [Sijua (Jherriah) 4,000 K.W., Dishergarh 3,500 K.W. and Associated 1,500 K.W.] of power only and it is doubtful whether this will meet all immediate needs. In our opinion, it is, therefore, important that the possibility of meeting unsatisfied demands from the capacity, if any, surplus with private plants should be explored and, where necessary, sanction under Section 28 of the Indian Electricity Act given. An apparent surplus of capacity over requirements is not, however, the criterion for deciding whether supply can be made to other consumers ; it is the safe surplus that is important. Whether such a surplus will be available from private plants is a matter for enquiry which, we think, should be quickly undertaken.

The position appears even less satisfactory in the Raniganj coalfield. As against the anticipated demand of 16,500 K.W. in 1948, the installed capacity will be only 20,500 K.W. and it is not certain that this will provide an adequate safe surplus of power to meet the demand. The increased coal production that may become necessary and the considerable increase in stowing that is likely to take place in the Raniganj field, as in the Jharia field, in the next few years will, in their turn, make substantial calls on electrical energy and we think, therefore, that a further close study should be made of power requirements in this coalfield. We have been unable to undertake this, but from our observations we are convinced that electricity is and will continue to be a serious bottleneck in the Raniganj field. The importance of an ample supply of electrical energy in the coalfields' area cannot be overemphasised, because around it must be built all the major plans, both for the conservation of coal through sand stowing and for the increase in production which is essential if the demands of Indian industry are to be satisfied.

Policy And Proposals Regarding Further Electricity Development.

8. There is, however, one comment that should be made regarding the adequate provision of electrical energy in the coalfields. The Electrical Commissioner, in his oral evidence before us, has referred to the serious economic disadvantages of installing small generating plants and has strongly advocated the use of large units. With the development of the Damodar Valley, now planned, the Jharia, Raniganj and Karanpura coalfields are well-placed to become the centre of a highly industrialised area and the Eletrical Commissioner estimates that, over the next 10 to 12 years, the additional electrical requirements of this area and of adjoining tracts, including Jamshedpur and Calcutta, may reach the high figures of 500,000 K.W. The Damodar Valley Scheme, with its associated thermal plants, is not likely, it is stated, to produce more than 300,000 K.W. of power. The scope for large thermal power stations large, because thermal power efficiency rises most rapidly with the size of the generating unit—is thus very great and in due course small generating stations may find themselves uneconomic. It is, therefore, necessary to formulate comprehensive and co-ordinated plans for development as soon as possible. Small isolated schemes can produce quick results, and may in certain cases be worth-while ; but those concerns which are forced by the exigencies of the present situation to consider installing them should at least be given the opportunity of knowing what Government plans are at as early a date as possible.

9. We may also consider here the question of the public supply companies operating in the coalfields. Uncertainty regarding the future policy of Government in the matter of electricity development is said to be preventing these companies from increasing their capacity for meeting the urgent unsatisfied demand from collieries. This uncertainty has reference particularly to the likely attitude of Government when the time for renewing the licences of the Companies arrives. The Electrical Commissioner has told us that most of these companies have fairly long terms still to run and that they can, with reasonable confidence, go ahead with schemes of essential development. But in this context we must also refer to the statement of policy as regards electrical development of which mention has been made by the Electrical Commissioner before us. The salient features of this statement, which was issued with the concurrence of all the Provincial Governments, are—

(a) the development of electricity supply in areas outside existing licensed areas should be actively pursued, as far as possible, as a State or quasi-State enterprise ; but if for any reason the State is not prepared to undertake such development in any area within a reasonable time, private enterprise should not be excluded ;

(b) provided efficient and economic operation could be assured to the public, options existing under any licence to acquire an undertaking should, as a general rule, be exercised when they arise.

The first of these statements echoes in fact what Mr. Treharne Rees recommended 25 years ago ; the second seems to provide adequate protection for the licensees in the Bengal/Bihar fields. It is, however, obvious that a more clear enunciation of policy in regard to existing licensees should be made and that this should be influenced by the definite plans that have been approved for electrical development under public ownership in the area. If no such plans exist, it would be a mistake to arrest essential development under private enterprise.

10. We have already referred to the small scale plans for augmenting electric supply in the Bengal and Bihar coalfields area and have made a passing reference to the Bihar grid and the Damodar River Scheme. It may be of interest if some further details of these schemes, vitally affecting the coalfields area, are given.

The power station of the Sindri Fertiliser Factory will have an installed capacity of 80,000 K.W. Out of this, firm capacity to the extent of 15,000 K.W. has been reserved for the Bihar electricity grid, but it is possible that a little more may be available in the early years. It is also proposed to extend the power station if and when the demand from Bihar arises. The Bihar Government have undertaken to instal the necessary transformers and to construct transmission lines from Sindri to Ramgarh in the west and to Seebpore in the east and to distribute power to the collieries and other consumers in the area. It is however, the intention that consumers located in the area of the existing licenses will be supplied electricity through the distribution systems of these companies. This will be the first link in the Bihar grid.

The Damodar Valley project, which is at present under detailed examination, contemplates the construction, in the next 7 years, of four dams with installed hydro-electric generating capacity as follows :—

Tilaiya Dam	4,000 K.W.
Maithon Dam	39,000 K.W.
Aiyar Dam	30,000 K.W.
Panchet Hill	40,000 K.W.

These power stations, in combination with the power made available from the Sindri Fertiliser Factory, will constitute a hydro-thermal combination which will eventually form part of the Bihar grid. As to the need and justification for large power developments on this side of India we cannot do better than reproduce the following extracts[1]/from the " Preliminary Memorandum on the Unified Development of the Damodar River " prepared by the Central Technical Power Board in August 1945.

> " *Existing Power Developments.*—Prime statistics of the generating power stations in the Damodar Valley for the year 1943 show that the total installed capacity withing the area amounted to approximately 137,000 K. W., producing an annual output of about 284 million K.W. hrs. in 1943. The following table is a sub-division of the sources of energy generation :—

TABLE 4

Summary of Electric power generating stations in the Damodar Valley in 1943

Number	Classification	Installed Capacity in K. W.	Generation in million K.W. hrs.
5	Electric Public Utilities	40,308	108,754
9	Railway Power Stations (excluding railway owned colliery Power Stations)	2,080	4,113
32	Colliery Power Stations	43,235	65,304
6	Other Power Stations	51,475	105,989
52		137,098	284,160

[1]Paras 76 to 79, 81, 84 and 85.

"The works cost of power generation (*i e.* cost of fuel, salaries and wages, stores and maintenance) at the thermal stations of the Electric Public Utilities shown in the above table varies from about anna 0 47 to annas 2 0 per K.W. hr. sent out from the power stations. The average cost of generation in the Electric Public Utilities is probably of the order of 0.62 anna per K.W. hr. sent out and there is every reason to suppose that the average generating cost in the other power stations in the area is likely to be of this order. In fact, in view of the large number of small power stations in the area it is probable that the average cost of generation over the whole valley exceeds 0·62 anna per K.W. hr. sent out.

"The following table shows that in addition to the capacity installed within the Damodar Valley there is in existence a total installed capacity of about 515,000 K.W. within transmission distance of the Valley.

TABLE 5

Summary of major sources of electric power generation located within 150 *miles of the Damodar Valley*

Name of Station and Place	Province	Installed capacity K.W.
Associated Cement Co., Ltd., Khalari Power House, Khalari	Bihar	4,000
Sone Valley Portland Cement Co., Ltd., Japla	,,	12,000
Kargali (Railway Board Collieries)	,,	4,500
Dalmia Cement Co., Ltd., Dalmianagar, Dehri-on-Sone	,,	12,000
Patna Electric Supply Co., Ltd., Patna	,,	6,000
East Indian Railway Installation, Jamalpur	,,	5,950
B. & A. Railway Installation, Kanchrapara (Calcutta area)	Bengal	4,500
Gouripore Electric Supply Co., Ltd., Naihati (Calcutta area)	,,	27,000
Calcutta Electric Supply Corporation, Ltd., Cassipore	,,	93,125
Calcutta Electric Supply Corporation, Ltd., Southern Power Station	,,	111,250
Calcutta Electric Supply Croporation, Ltd., Mulajore Power Station	,,	91,000
Bengal Nagpur Railway Installation, Kharagpur	,,	7,700
Indian Copper Corporation, Ltd., Ghatsila	Bihar	6,464
Tata Iron and Steel Co., Ltd., Jamshedpur	,,	130,000
	Total	515,489

"*Proposed Future Plants.*—Owing to the growth in load, obsolescence of existing plant, and suspension of construction during the last few years, there is an urgent need for the installation of additional sources of power supply in the region. Extensions of existing stations and new installations planned for commencement before 1950 total about 327,000 K.W. of which 195,000 K.W. are in the Calcutta area. In adition, it is very likely that by 1960 a further 325,000 K.W. of generating plant will have to be installed in the region, of which probably 265,000, K.W. will be required around Calcutta.

"*Power available from the proposed multi-purpose Damodar Development.*—The total amount of power which can be generated at the eight hydro-electric power stations included in the unified development of the Damodar River is estimated at 65,000 continuous kilowatts of primary power, and an additional amount of intermittent or seasonal power which is estimated to vary in magnitude up to about 65,000 K.W. and in availablility from 20 per cent. of the time to 80 per cent. of the time on the average. The average annual output of the hydro-electric system, over a period years, would be about 800 million kilowatt hours, varying from a minimum annual output of 585 million kilowatt hours to a maximum of 930 million kilowatt hours during a 10-year period of record.

* * * * * *

"*Hydro-electric power Utilization.*—It is unlikely that a market could be found for a substantial block of intermittent or seasonal power which may not be available every year and which, when available, could be utilized only during the off-peak hours of the week, unless additional hydro-electric capacity were installed which would make the seasonal power continuously available during wet seasons. A possible market for this type of power is suggested on account of its coincidence with the increased pumping loads at some of the collieries during the the wet season. However, it is doubtful if installation of additional hydro-electric generating capacity for this purpose would be economically justified.

* * * * *

"*Installed Capacity.*—The generated peakload of a combined system of thermal and hydro-electric plants capable of utilizing all available hydro-electric energy would be in the order of 300,000 K.W. assuming that the annual load factor is approximately 60 per cent. As given above, the total thermal power capacity now installed in the Damodar Valley and vicinity is about 650,000 K.W. of which a large portion may be considered obsolete. The plans for additional capacity installation in the future are a further indication that there is a market for a block of cheap power of at least this magnitude.

"The total installed capacity of a combined system capable of generating a peakload of about 300,000 K. W. would be approximately 350,000 K.W. Because of the lower capital cost of additional capacity installations at hydro-electric stations as compared with thermal stations, as well as the lower operating costs, the installation of the thermal stations should be kept to a minimum consistent with the requirements for continuity of service. The energy generated by a system producing 300,000 K.W. at 60 per cent. load factor is equal to a load of 180,000 continuous kilowatts at station switch boards. Of this amount the hydro-electric plants can produce about 65,000 continuous kilowatts during a dry period, and the remaining 115,000 continuous kilowatts during this period should be produced by the steam plants. A thermal capacity installation of 150,000 K. W. operating on base-load during the dry season is deemed to be sufficient for this purpose including requirements for spare capacity and station

service. The remaining 200,000 K. W. would be installed at the hydro-electric plants. An installation of this magnitude at the hydro-electric plants is sufficient to utilize all available hydro-electric energy during the wet period on the base of the load curve and in addition, sufficient hydro-electric capacity will be in reserve during the year to eliminate the necessity of carrying thermal capacity on spinning reserve.".

Amplifying the foregoing, the Electrical Commissioner in his evidence before us stated that big demands for power from the Damodar Valley Scheme may be made from Calcutta and elsewhere. A recent load survey discloses that in 10 years the aggregate of additional loads required in the Raniganj, Jharia, Karanpura, Bokaro and Daltonganj coalfields, in the mica mines near Kodarma, in Bihar, Chotanagpur and West Bengal would be of the order of 300,000 K. W. With the additional demands from Calcutta and elsewhere perhaps of the order of 150,000 K.W. and of the railways when electrified, the total additional requirement is likely to reach 500,000 K.W. But the Damodar Valley Scheme is unlikely to be able to produce more than 300,000 K. W. of hydro-electric and associated thermal power. This points to the inevitable need for installing other large thermal generating stations or hydro extensions of the Damodar River Scheme. We are, of course, principally concerned with the position in the coalfields, where a big additional demand for power is likely to arise in the near future following extended sand stowing and the increased working of partially developed areas. We have considered this question in relation to the Bengal and Bihar fields and we think there is a *prima facie* need for installing at least 3 large generating units, one in the Jambad-Kajora area of Bengal, one in the Bokaro field, and the third in the Karanpura field in which large scale mining operations are necessary. The Jambad-Kajora area will shortly see a considerable increase in sand stowing as a result of a project under the consideration of the Stowing Board, and the consequent power requirements must be met. The Bokaro field is the second obvious site in view of the abundant availability of cheap, low grade, quarry coal and a power station in this area could probably be a link in the chain of railway electrification. On the capacity of the generating plants to be installed, we can only express a general opinon. In view of the Electrical Commissioner's remarks about large units and of the undoubted future power demands in this tract, we think that three 50,000 K. W. plants would be suitable.

11. In some quarters fears may be entertained regarding the future markets for coal on the completion of electricity schemes, such as the Damodar River Scheme. These fears, we think, are unfounded. Experience in other countries has shown that the development of electric power is accompanied by increased demands for its use all round. We have already referred to estimated additional requirements of 500,000 K. W. of electrical energy in and around the coalfields of Bengal and Bihar during the next 10 or 12 years. Only a portion of this energy, perhaps less than half, will be met from hydro-electric sources. The rest must come from coal and if present hopes are realised, it may well be that the increased demand for coal for electricity generation in the coalfield areas alone will amount to half a million tons per year. The greater industrialisation that must inevitably follow the availability of cheap electri ity will add its own substantial quota of demand.

12. During one of our visits to the Central Provinces, we had occasion to discuss with representatives of the Central Provinces Government the question of electrical development in the Pench Valley. We had earlier received evidence, in personal discussion, of the keen demand for electrical energy and of the inadequacy of the present supply. The question of installing further generating plant in the Pench Valley was under discussion between the Central and Provincial Governments for some time but we understand that difficulties arose over the question of financial guarantees and that the whole matter has been held up. We gather, however, that the Central Provinces Government contemplate the creation of an electrical grid which may, in the event of adequate demand, be extended to embrace also collieries in the Pench Valley. Enquiries as regards the likely off-take were being made from the collieries in April 1946 and we had some informal discussions with the Central Provinces Government about the relative advantage of linking up the Pench Valley with the grid and the installation of separate generating plant in the Pench Valley itself. Colliery needs demand a guarantee of sustained supply which may not be forthcoming in the system of single transmission lines which the Central Provinces Government seem to have in mind. If double transmission lines are considered uneconomic, as they were stated to be during our discussion, we think the case for a separate generating plant in the Pench Valley area should be studied afresh. In doing so, the very considerable demands that are likely to be made on this coalfield for meeting the coal requirements of Western India should be borne in mind. As will appear later in our report, the Central Provinces and Central India coalfields are well situated for meeting the coal requirements of Western India and we have no doubt that an appreciable increase in the output of these fields will be called for in the near future. This increase will, however, prove most difficult of attainment unless adequate electircal power is available.

13. We have already referred to the importance of electrical energy for the production of coal. Expansion in production will be seriously retarded in the absence of adequate electrical energy. To what extent coal production will suffer on this account, it is difficult to say. But it is certain that our plans for development and especially development through increased mechanisation, are very largely dependent on electricity. The absence of an adequate power supply will also stultify our proposals for sand stowing on a large scale.

The use of electricity for colliery purpose will release certain quantities of coal for other use. It is estimated that the saving might well be 50 per cent. of the present colliery consumption for steam raising. There are no accurate figures of such consumption but we think that the saving in coal if there is a general use of electricity by collieries would release a million tons of good coal for other use. This is no insignificant quantity and to it would, of course, be added the increased production that will inevitably follow the use of electricity in the hitherto un-electrified mines.

14. The effect on coal requirements of electricity schemes in other areas must also be considered. We have already dealt with the increased requirements of coal consequent on the development of thermal generation. But such thermal electricity inevitably displaces coal as a source of industrial power. The Electrical Commissioner thinks that perhaps 90% of the electricity generated in India, or even more, is used for industrial purposes. We have no exact figures of the relative efficiency of coal when used for steam and electricity generation. With reference to locomotives, Sir Padamji Ginwalla

states that the use of electricity reduces the consumption of coal by 40% for the same effort. On this basis, the increased consumption of 1·5 million tons of coal over the next ten years for electricity generation (as stated in Chapter IV), should displace about 2 25 (90% of 2·5) million tons of coal used for industrial purposes. The net saving would thus be ·75 million tons, much of it of good quality.

In an earlier paragraph we referred to fears about the possible displacement of coal of hydro-electricity. At Lahore we were told of the plans of the Punjab Government for closing down thermal generation of electricity at Lahore on the completion of the Bakhra Dam scheme ; but we do not think that there will be any large displacement of coal for industrial purposes in consequence. It is an accepted fact that the provision of cheap power facilities increases industrial demands for power, whether thermal or hydro-generated, out of all proportion to be the provisions made, and there is no reason to apprehend any diminution in the demand for coal for industrial purposes. Experience in the Tennessee Valley has shown that the consumption of coal has actually increased in the areas served by the Tennessee Valley Authority.

Electrification of the Railways

15. A most important aspect of the more efficient utilisation of coal for power-generation has been brought prominently into public debate by Sir Padamji Ginwalla in his booklet on " Industrialisation through Electrification of the Railway ". Sir Padamji's main thesis is that, under the best conditions the use of coal in locomotives for generating motive-power is a most wasteful way of utilising coal—he puts down the average thermal efficiency of a locomotive boiler at 3 to 4%; that it is criminal folly to go on burning vast quantities of superior metallurgical and steam coals in locomotives when the reserves of such coals in India are notoriously limited ; that under the conditions obtaining in the Jharia and Raniganj coalfields the generation of thermal electricity would be considerably cheaper than hydro-electricity ; and that all the conditions such as traffic, density of population, raw materials and vast quantities of cheap low grade coal, point to complete electrification of the entire area including the railways. He goes on to suggest that, if the railways were to give a lead in this matter, they would not only be benefiting themselves by having a more efficient service and having less coal to move, but would also be materially assisting in the electrification of the country-side which in its turn would lead to the setting up of new large-scale industries and give a fillip to cottage industries. We share this view.

16. We reproduce below a statement given to us by the Railway Board showing the railway electrification projects which are now under examination—

Railway.	Section proposed for Electrification	Mileage of Section.
		Miles.
Bombay, Baroda & Central India Rly.	Bombay-Ahmedabad	270
Great Indian Peninsular Railway	Igatpuri-Bhusaval	191
	Poona-Dhond	48
	Dhond-Manmad	146
East Indian Railway	Howrah-Gaya-Moghalserai Howrah-Bandel-Burdwan	444

Railway	Section proposed far Electrification	Mileage of Section
		Miles.
South Indian Railway	Tambaram-Villupuram . . .	83
	Chingleput-Arkonam	39
Bengal Assam Railway . . .	Calcutta-Ranaghat	46
	Calcutta-Bongaon	48
	Southern Section	37
	Total .	1,352

The most important of the schemes, from all points of view, is the electrification of the track from Howrah to Moghalserai on the East Indian Railway; its importance arises principally through the close proximity of the area to the rich coal-bearing tracts of Bengal and Bihar. While we do not wish to minimise the importance of electrification of the track wherever this is considered feasible, we consider that Government should treat the East Indian Railway scheme for electrification from Howrah to Moghalserai as of first priority.

17. We were told by the Railway Board, with reference to this track, that a general project survey has been made by the East Indian Railway and that they have since been instructed to contact their consulting engineers with the object of preparing a detailed project. These preliminary investigations are expected to be completed in about twelve months' time and the stage will then be reached for taking decisions.

Amongst the reasons which have influenced the Railway Board into ordering the survey are the following :—

(*a*) On certain sections between Howrah and Moghalserai, the capacity of the double track is approaching its limit and the increased loads and speeds which electric traction would make possible probably provide economic justification for switching over to an electrified track.

(*b*) There is a very strong public demand that the comparatively wasteful burning of coal in locomotive boilers should cease and the Railway Board are anxious, as far as possible, to assist in the conservation of the higher grades of coal particularly.

(c) The abundance of lower grades of coal in the Bengal/Bihar fields would permit of the cheap generation of thermal electricity in stations located in these areas. This would not merely provide a useful market for the inferior grades of coal but would also eliminate the considerable haulage of coal which even now is taking place on railway account over this length of track.

18. The Railway Board have, however, been careful to point out that an adequate return on the capital outlay on thermal power stations for electrification purposes may not be forthcoming and they wonder whether the coal industry or other industries in India, which will benefit through the conservation of high grade coal, should not be called upon to make a contribution for offsetting the loss, if any, that the railways may incur. In our view this is an entirely wrong approach to the problem. The question primarily is whether, placed as India is in regard to coal resources, it is advisable to avoid the wasteful use of coal, and, in particular, of high grade coal. We

do not think that two answers to this are possible. It is not merely the compartmental consequences on railway finances that must be considered, though we have heard no reasoned statement of the fears as to likely loss. The State must take account of the many imponderable advantages that will flow from the widespread availability of electricity. It is desirable that railway electrification of the track should be closely linked up with the large-scale hydro-electric and thermal development which is planned for the Damodar Valley. There is a considerable anticipated deficit of power requirements over the next 10 or 12 years and there is no reason to suppose that, when eventually a well-knit hydro-thermal combination comes into being, the State will find its outlay unprofitable.

19. From the strictly limited point of view of coal conservation there is evidence to show that the electrification of one mile of track is likely to lead to a saving of 400 tons of coal per annum. This is borne out also by the statement of the East Indian Railway that the daily coal consumption on the line between Howrah and Moghalserai is of the order of 1,100 to 1,200 tons. Allowing for the relative efficiencies of electricity and steam generation and for the inevitable small requirements of coal even after electrification, the figure of 400 tons as the net saving does not appear to be high. The net saving on the track as a whole between Howrah and Moghalserai is therefore likely to be of the order of 200,000 tons per annum, $\frac{2}{3}$ of which or perhaps even more represents good coal. The real saving of high grade coal is, however, nearly twice as large since the requirements for thermal generation will be of inferior coal only. The saving of high grade coal thus effected and the additional demand for inferior coal that will arise for the thermal power stations will confer substantial benefits on industry generally in the country and on the coal industry.

20. The area served by and around the Howrah-Moghalseraia line with its rich mineral resources seems destined to be the centre of large-scale industrialisation and greatly intensified traffic is to be expected. Steam traction is most unlikely to provide the answer for this increased demand. Quite clearly, in this matter, we have to take the long view and, as in all progressive countries, the railways must be the fore-runners of industrialisation. Time and again it has been proved that industry follows where the railways lead. The scheme for electrification in this area is, in our considered opinion, one of the important projects before the country at present.

21. Our emphasis on the Howrah-Moghalserai electrification scheme does not, as already stated, minimise the importance of actively pursuing schemes of railway electrification elsewhere in India. To the extent that the State through its railways can economise on coal consumption, it will facilitate the satisfaction of other industrial demands ; and in this matter it is not merely the coal released by the railways that is important but also the release of transport capacity that will follow.

22. It is premature to assess the total saving of coal that may result in the next few years from electrification of the railways but the projects selected for examination seem *prima facie* to have justification. We have one further suggestion to make in this matter. In the event of electrification of the East Indian Railway from Howrah to Moghalserai, we see no valid reason why the adjoining track of the Bengal Nagpur Railway should not also be electrified. We are attracted by Sir Padamji Ginwalla's suggestion that the Bengal Nagpur Railway track from Gomoh to Kharagpur and then on to Calcutta and from Adra to Tatanagar should be electrified.

The Bengal Nagpur Railway representatives told us that they had given no thought yet to the question of electrification but agreed that electrification has definite possibilities. Even on a conservative estimate of a thousand miles of track electrified all over India in the next few years, the net saving of coal would be about 400,000 tons per annum, most of it good coal. The economy in the consumption of high grade coal is really much larger probably in the neighbourhood of half a million tons per annum.

23. The saving of coal through the use of electric power for mining and industrial purposes can be briefly stated to be as follows :—

(*a*) The displacement of inefficient boiler plants in collieries may well secure a net saving of about a million tons per annum.

(*b*) A saving of coal of the order of three-quarters of a million tons per annum will also result from the further electrification schemes in other parts of India which the Electrical Commissioner visualizes.

(*c*) Railway electrification in its turn will result in an economy of nearly half a million tons of good coal per annum.

The total is roughly 2¼ million tons per annum but the coal saved is not a surplus. It is coal that will be fed to other industries, both existing and new. Electricity does not destroy the markets for coal but creates and fosters them.

Conclusions And Recommendations.

(1) There is urgent need for increasing the supply of electricity in the coalfields and we recommend that **a comprehensive survey of power requirements should be undertaken forthwith.**

(2) Electricity development should aim at the installation of large power units and **three generating plants of 50,000 K. W. capacity each should be immediately installed in the Bengal/Bihar fields. The question of adequate supply in the Central Provinces should also receive immediate attention.**

(3) There is need for an early clarification of Government's policy in regard to private power development; **unless an adequate supply of electricity in the coalfields is arranged, under public control, private installation should be permitted to go forward in the interests of coal production.**

(4) We believe that hydro-electric development in the Damodar Valley will be of direct benefit to the coal industry.

(5) **Electrification of the railways should be undertaken in the vicinity of coal fields and the scheme for electrification of the East Indian Railway from Howrah to Moghalserai should receive first priority.**

(6) Large-scale electrification may result in a reduction of coal consumption by nearly 2¼ million tons of good coal per annum.

CHAPTER VII.

CONSERVATION.

The General Case For Conservation.

Against the background of comparatively limited resources of good quality coal in India, it is natural that attention should be focussed on conservation as a means for safeguarding the future of industry. Much argument has centred round the subject but not infrequently there is an improper appreciation of the issues involved. To start from the beginning, therefore it is necessary to state what we mean by conservation and what it can secure. To our mind, there are three well defined aspects of conservation in reference to coal, *viz* :—

(*i*) reservation in use, *i.e.*, the use of certain coals by specified classes of consumers only and by none others ;

(*ii*) rationalisation in production, *i.e.*, the extraction of certain coals so as to secure a balancing of output with consumer requirements; and

(*iii*) adoption of mining methods which aim at maximum possible extraction in all the circumstances of a case.

The first two, in effect, relate to the supply of coal to the consumers' requirements, while the third may be described as the avoidance of waste in mining. All these three questions have come under examination in the last 25 years. The Coalfields' Committee, 1920, drew attention to the avoidable waste of coal that was taking place due, amongst other things, to faulty working methods, including the formation of inadequate pillars resulting in fires and collapses. In some cases, the small and irregular shapes of holdings incapable of being worked satisfactorily led to encroachments attended with dangers of communicated fires and floods. The Coal Mining Committee, 1937, estimated that the total waste of coal *in situ* in working was about 50% and considered that this waste arose from mining methods which were either bad under all circumstances or had been forced on the industry by economic conditions and circumstances over which the mining community had little or no control. Certain aspects of conservation were also considered by the Committee with reference to coking coal required by the iron and steel works.

2. Reservation, on the utilisation side, has the object of ensuring that certain classes of coal are conserved by prohibiting the use thereof by other than specified types of consumers.

A country having abundant resources of coal may be little disposed to pay attention to the question of conservation in use. Indeed, there are many who believe that the advance of science may within a few short years appreciably reduce the importance of coal to industry and argue, therefore, that the conservation of coal is unnecessary. They contend further that such conservation accompanied, as it inevitably must be, by Government imposed regulation would have an unsettling effect on the coal industry on the one hand and on consumers on the other. We fully realise the significance of scientific research in relation to the power problem, but the advance of science over the last 150 years has not seriously affected the industrial use of coal, and while this may not necessarily hold true for the future, there are uses and processes of a specialised nature for which coal will continue to be necessary. We have in mind the dependence of the chemical and other industries on coal and its bye-products. There is also the

almost complete dependence of the iron and steel industry on coal as the most suitable raw material so far known for reducing iron ore to pig iron. In such circumstances, even a country with very large resources cannot afford to be extravagant in the use of coal; the U.S.A., for example with its huge reserves, is devoting increasing attention to the question of conservation. The need for caution is greater in India, for while our total reserves of coal may be large, the reserves of those coals which are likely to retain their specific importance for certain industries are comparatively limited. We have shown elsewhere that the reserves of good coking coal with the present rate of extraction and use may not last longer than 65 years. Again, while our reserves of other good quality coals are relatively larger, it is alleged that we have not over-much of those high volatile coals on which a sound and enduring chemical industry can be built. It is, therefore, to the conservation in use of good coking and high volatile coals that attention must primarily be directed; and in a lesser degree, other good coals must also be considered.

Conservation of Good Coking Coal.

3. Our terms of reference require us to report on the need for the conservation of high grade metallurgical coal and in our questionnaires we have used the same term. We have taken this to mean coal suitable for making the hard coke required for the reduction of iron ore to pig iron in a blast furnace. The main characteristics of such a coal are that on carbonisation at high temperatures it yields a hard coke, preferably of low ash content, with a fine porous texture and sufficient mechanical strength to resist abrasion or breakage in blast furnaces; low sulphur and phosphorus content are also important. The Tata Iron & Steel Co., Ltd., have given the following more detailed specifications of suitable coking coal (relating to samples dried at 105°C):—

(*a*) Swelling properties . .	must be non-swelling.
(*b*) Phosphorus . . .	Below 0·15%
(*c*) Sulphur	Below 0·6 %
(*d*) Caking Index . . .	15 and above.
(*e*) Ash	Below 17%.
(*f*) Volatile matter . . .	26%
(*g*) Fixed carbon . . .	57 to 58%.

Explaining the specifications further, they have stated that the coal should

(*i*) not swell on being carbonised, as otherwise the walls of the coke ovens will be injured;

(*ii*) not be too high in phosphorus content in view of technical difficulties in its removal to an extent that will yield a steel with a sufficiently low phosphorus content;

(*iii*) not be too high in sulphur content, as otherwise a vicious circle of more limestone and more heat to remove the sulphur in the blast furnace and thus more coke and more sulphur input is created;

(*iv*) have coking properties;

(*v*) have the ability to make a coke of certain physical characteristics, *viz.*, strength, hardness, size and porosity, which for good coke are fixed by the following recognised standards:

shatter Index . .	Over 82/92
Haven's Stability .	Over 50·0%.
Breslau's Hardness .	Over80·0% (over 40 mm. indicating hard coke)
Porosity . . .	Over 42·0%
Size over 3" . .	50 to 60%
Size 2" to 3" . .	35 to 45%.

(*vi*) have a carbon content high enough to give a coke with at least 75% of carbon; and

(*vii*) have an ash content as low and as uniform as possible; the higher the ash the more limestone is needed which in turn calls for more heat, more coke and more ash. The maximum ash that can be tolerated in the coke is 22.5% and if there is an increase over this figure difficulties in operation are encountered.

4. So far as we are aware, there has been little controversy over the specifications of coking coal mentioned above other than the ash content. As regards ash, however, it has been suggested that the iron and steel companies in India have set for themselves too high a standard and that it should not be impossible to conduct blast furnace operations with coke of higher ash content. Attention is drawn also to the history of coal supplies to the iron and steel works during the war years when the provision of higher ash coal does not seem to have seriously interfered with pig iron manufacturing operations; but it is known that the coal did seriously affect the outturn figures of the blast furnances. It is urged, further that the exhaustion of reserves of low ash coking coal makes it incumbent on the iron and steel works to adapt themselves to the use of higher ash coals by processes such as blending and cleaning.

5. As regards blending, some work has been done in the past and the results are well-stated in the following extracts from a memorandum submitted to us by the Tata Iron & Steel Co.

"As regards utilisation of inferior grade coals, it has to be studied in respect of the following classes :—

(*i*) High ash with normal caking index—(ash from 16·0 to 20·0% and caking Index 15 and above.)

(*ii*) High ash with sub-normal or semi-caking properties—(ash up to 20 0% and Caking Index between 10 and 15.)

(*iii*) High ash and poor-caking—(ash exceeding 20·0% and Caking Index below 10).

(*iv*) Low ash, high volatile and sub-normal or semi-coking—(Ash 11 to 15 0%; volatile matter above 32 0% and Caking Index between 10 to 15).

(*v*) Low ash, high volatile and poor caking—[ash and volatile matter as in (*iv*) above and Caking Index below 10].

(*vi*) Low ash, high volatile and non-caking—[ash and volatile matter as in (*iv*) and (*v*) above].

"Right from the early periods, in arranging for the mixing of coals, it had been contemplated to use substantial quantities of coals such as Kustore 12, 13 and 15 seams, Bhuggutdih 11 and 12, Choitodih and Sijua 16 seams coming under item (*i*) mentioned above. They were invariably below 20% in ash and had normal caking properties with a caking index of 15 and above. Their use was possible hitherto because of the availability of very good grades of low ash coking coals for mixing and keeping the ash content low in the mixture to the necessary point.

"The reasons for the latest troubles experienced due to the continued use of these high ash coals were the simultaneous non-allotment of good classes of low ash coking coals such as Gopalichuck, Central Kirken, Jharia Khas, Badruchuck, etc., and the deterioration in the quality of the rest included in the programme of supplies.

* * *

"As regards other categories of inferior grades of coals, the progress of researches by the Coal Blending and Coking Research Sub-Committee has been only at their initial phase so far.

"Laboratory blending tests done with some of the better quality coals occuring in seams below 10 in different areas of the Jharia coalfield and which should come under item (*ii*) above, indicated that coke with sufficient strength might be expected from a mixture of suitable class of good coking coals and varying proportions from 20·0 to 40·0 % of the former coals.

"With the below 10 seams Jharia coals included under item (*iii*) which have ash content exceeding 20·0% and Caking Index below 10, it appears that only some selected few from among them could be used, to the extent of 20 to 30 % depending on the quality of the coal used for blending with them.

"The conclusions are entirely tentative as it has to be confirmed by large scale coking tests and putting the coke produced to actual use in the Blast Furnaces. Further in view of the prospective successful development of washing of these coals, the suitability of the coke from the view-point of their ash content has not been considered.

"However, in the event of suitable class of superior coals being available for blending, it might be possible even now to exploit some of the selected ones from below 10 seam for metallurgical purposes. But this proposition gets importance only next to coking coals from the top seams of the Jharia field, whose high ash contents preclude their use for coking at present.

"All the Dishergarh and Poniati seam coals in the Ranigunj coalfield tested so far for blending and coking shall have to be classified under item (*iv*). Individually, although they will not be suitable for making coke, preliminary laboratory experiment showed that 20 to 40% of these coals could be expected to be absorbed in a coking coal mixture with other suitable coking coals.

"Item (*v*) is likely to consist of mostly Ranigunj coals from seams other than Dishergarh and Poniati. Of these, only Sirka with a Caking Index 6 has been tested so far. The results indicated that it could be absorbed to the extent of 10 to 15% in the normal coking coal mixture we have nowadays.

"A few coals from the Central Provinces and the Korea State experimented upon lead us to believe that, ingeneral, it would be very difficult to utilize them for coking purposes, even with most efficient methods of blendng. Attempts, however, might be made to take about 10·0% of them in present day mixture, mostly composed of the best available class of coking coals.

"The researches being now only half way and incomplete, it would be unwise to place too much reliance on the reports or be over-optimistic about the provisional conclusions. All the same, one cannot fail to realise that these serve as useful pointers (for the guidance of the Coal Committee) in the task of collection of statistics, preparation of future programme of distribution and formulation of necessary proposals.

"It needs reiteration that in future, the average coal mixture consisting more of high volatile coal would be capable of absorbing only reduced quantities of inferior grades of coal and, therefore in the interests of extending the use of inferior coals for coking, the low ash, low volatile good coking coals in the Jharia field, have to be exclusively reserved for regulated supply to the steel companies."

The foregoing emphasises the significance and possibilities of coal blending for metallurgical purposes. But unless there is a more intensive physical and chemical survey of all Indian coals, it will not be possible to say with any definiteness to what extent our resources of good quality coking coal can be expanded further by admixture with semi-coking or high ash coals. It is, however accepted that the proportion of high ash or semi-coking coals in the coke mixture to be fed into the blast furnaces cannot be very high; it may vary from 20 to 40% depending on quality and 25% seems to be a reasonable average.

6. The cleaning of coal as another means of augmenting the limited reserves of good quality coking coals has lately figured in discussion on this subject and considerable work has been done by the Tata Iron & Steel Co., Anderson Wright & Co., and the Indian School of Mines. A good deal of cleaning by hand picking is being done now, but the inadequacies of such cleaning have become increasingly apparent as the quality of the coal has deteriorated. The Tata Iron & Steel Co. state:—

> "With the increasing exhaustion of these seams (Nos. 12, 13, 14, 14-A, 15, 17 and 18 of the Jharia field) others had to be drawn on to supplement supplies but the shale and clay bands and coarse grained coal did not permit that degree of consistency which was necessary. Intensive picking by manual labour may have improved the quality but the human element is not conducive to the regularity required. The fact remains that by picking by hand the quality can be improved and where this can be done by manual labour it can be more efficiently done by mechanical means and with a higher degree of consistency and regularity. In some places, as high as 25% to 30% of the coal is being rejected by manual picking. Good, bad and indifferent coal is being discarded by manual pickers whereas mechanical washing plants will separate these grades with a high degree of efficiency and provide consistent grades with the minimum loss. Several plants have been evolved to deal with coals which have the physical properties of Indian seams and Heavy Liquid Separation plants such as the Chance Sand Washer, Barvoys' Washer and Tromp Washer are suitable for this purpose. These plants will not remove the inherent ash but they will at least eliminate the adverse constituents which permeate many of our seams."

A summary of the experiments conducted at the Indian School of Mines on coal drawn principally from seams, 7, 8, 9, 13 and 13 B of the Jharia field is given below:

Seam 7.—Twenty-two samples with ash content ranging from 19% to 37% were tested. Adopting an ash content of 16% as a suitable limit for the manufacture of metallurgical coke, it appeared that the amount of clean coal resulting from washing varied between 16% and 85% according as the cash content of the original coal varied between 30% and 19%. In all cases the coal had been crushed to $\frac{1}{2}$" size before washing.

Seam 8.—Only four samples were tested with disappointing results though the number is too small to justify generalisation.

Seam 9.—Twenty-six samples of coals varying in ash content between 19% and 31% were tested and gave a recovery of from 15% to 84% of 16% ash coal.

Seams 13 and 13B.—The samples tested contained from 16.35% to 21·92% of ash and all gave over 80% of coal with 13% of ash. Coals with an ash content of 21.92% gave 88% of clean coal with 16% ash.

7. It is difficult to generalise with confidence in the light of the foregoing experiments; but the cleaning of coal by washing seems to have considerable potentialities. There is, too, a difference between the result of blending and of washing. Blending can at best add to our resources of coal suitable for metallurgical purposes to the extent of about 25%. Cleaning, on the other hand, can produce a coal which is suitable by itself for being fed into blast furnances or for blending. Our resources will be augmented to the full extent that high ash coking coals can be washed to produce coking coal of good quality. The importance, therefore, of washing to the metallurgical industry of India is manifest. We have, therefore, gone into this question at considerable length and would draw attention particularly to the special questionnaire on washing which we issued to certain persons and their replies.

The salient points brought out in the replies are as follows :—

(*a*) Coal washing with the object of reducing ash content is feasible only if the ash exists in the form of adherent bands of clay or shale or in rough grained coal but not when it is present in inherent form.

(*b*) The question as to whether it is economical to wash a seam or not will depend on the physical characteristics of the coal and shale bands present in it.

(*c*) The most suitable form of washing for Indian coal so for testedis by heavy liquid separation incorporated in the Chance, Barvoys' and Tromp Washers. For Indian conditions, the Chance Washer appears to be best suited, because, amongst other reasons, it utilises sand which is readily available in the coalfields. Moreover, the cost of cleaning in this case has been estimated to be the lowest as will appear from the following :—

	Cost of washing per ton.
Chance	3 to 5 annas.
Barvoy's	14·2 annas
Tromp	12·9 annas.

(*d*) Washing may be said to have the effect of reducing ash content by about 5% generally.

(*e*) The price of plant with a capacity of 2,000 tons per day erected at ite is at present approximately Rs. 9 lakhs.

Considerably more work will have to be done before the full possibilities of washing for the purposes of producing a coking coal of sufficiently low ash content for use by the metallurgical industry can be ascertained. The suitability of a coal for washing and the question as to whether washing in particular cases would be justified on economic grounds are matters which can be settled only by detailed experiments in the laboratory and on a pilot plant scale. Some progress is being made, but in view of the importance of the question, it is not one that can be left entirely in the hands of private initiative. In addition, therefore, to a study of blending coal for metallurgical purposes, it is important to undertake large-scale tests of washing possibilities; and until coal from all likely seams has been examined, it is difficult to say to what extent the resources of coal suitable for metallurgical purposes can be augmented by washing. One opinion may perhaps be expressed : cleaning by washing is unlikely to yield results of significance to the metallurgical industry when practised on coals with an ash content in excess of 25%.

In illustration of what washing can achieve, we give below the results of a prolonged experiment conducted in an American coke oven plant;

"1. Washing reduced the ash content of the coal by about 1·2 per cent.

"2. Washing of the coal resulted in a 10 to 15 per cent improvement in the physical qualities of the coke as determined by the tumbler test and also increased the yield of usable coke by about 2 per cent.

"3. The resultant improvement in quality of coke had the following effects on blast furnace performance—

a. Coke consumption reduced by 5 to 8%.
b. Amount of flux reduced by 5 to 10%.
c. Slag volume reduced by 5 to 8%.
d. Blast pressure reduced by 5 to 8%.
e. Production of iron increased by 5 to 8%.

"4. Washing the coal reduced the hydrogen sulphide content of the gas about 20%."

8. After these preliminary remarks, it is possible to review the position as regards reserves of coal suitable for metallurgical purposes. In our opinion, there are about 750 million tons of good coking coal which can be used for the manufacture of matallurgical coke. The Blending of semi-coking or high ash coal with good coals may extend these reserves by 25%. Finally, there are the possibilities of washing which apparently has to be confined principally to the seams below 12 in the Jharia field and to certain coals from Bokaro. According to the Memoirs of the Geological Survey of India, the reserves of coal in seams 1 to 12 up to a depth of 2,000 feet in the Jharia field are approximately 3,125 million tons or somewhat less than 3,000 million tons if the reserves in seam 12 are excluded. The reserves of workable coal reported to us in these seams are about 1,375 million tons. It is, however, most unlikely that the coal in all seams from the No. 1 to No. 11 or in all portions of a seam can be successfully washed to yield a product for use by itself or in blending with good coking coal. The experiments carried out at the Indian School of Mines have indicated the likely suitability of seams 7 and 9 for this purpose and the reserves in these seams, as reported to us, are in the nighbourhood of 200 million tons. It is more than probable that further experiments will disclose the suitability of other seams for washing purposes. But, on the whole, we think it would be prudent not to estimate the addition to our reserves of good coking coal in consequence of washing at more than about 500 million tons, for allowance has to be made also for the loss on washing. The total reserves of coal suitable for metallurgical purposes may therefore, be placed in the neighbourhood of 1,500 million tons. But the reserves of good coking coal, whether found in the natural state or obtained by washing, are probably limited to about 1,250 million tons and without these blending cannot be done.

Reference may be made here to certain figures of reserves which Sir Cyril Fox has given us in a memorandum.

	Reserves (million tons)
Low sulphur coking coal	1,250 to 1,500
Possible reserves of caking coal made by blending with suitable non-caking coals and by actual conversion of satisfactory non-caking coals into good caking coals	Upwards of 6,000

Sir Cyril Fox states, as regards the latter figures, that though they "must be regarded as largely conjectured estimates .... such conversion has been experimentally demonstrated on a laboratory scale and an Indian Patent has been taken out for one such process", but without much further investigation and trial it would be unsafe to build on the basis of possible large-scale conversion of non-coking coals into coking coals. Further, while it may be true that the resources of non-caking coals suitable for blending are large, there is a limit as we have shown earlier, to the extent of use of such coals for blending purposes.

9. In view of the considerable controversy that has centred round the coking coal requirements of the iron and steel works, it was fortunate that we had the opportunity of discussing this question with Mr. Wm. A. Haven of the U. S. A., a recognised authority on blast furnance technique. A summary of the discussions is reproduced below:

"Mr. Haven pointed out that metallurgical coal should have certain physical and chemical properties. Structural stability which good coke provides in the blast furnace is as important as the absence of sulphur and phosphorus in the coals used; the phosphorus in Indian coals is a bad feature. It is not possible to correct chemical deficiencies such as high sulphur and phosphorus content by coke oven design and practice and the physical qualities can only be influenced to a limited extent. The physical qualities of coke can be somewhat contolled by regulation of oven temperatures, extent of pulverization of the coal, and particularly by blending coals. The ash content itself, however, can only be reduced by some form of coal cleaning. High ash cokes up to a limit can, of course, be used in blast furnaces but either larger quantities become necessary or the output and quality, of the pig iron suffer. In either case, the cost of the pig iron increases.

"In the U.S.A., supplies of the best grades of metallurgical coal are diminishing and in certain areas blast furnace practice has suffered. Two steel works were built during war-time in the U.S.A., in the Western regions, where only poor coal is available. The Geneva plant decided to use the local inferior grade coal only and allowed its blast furnace capacity to suffer. But at Fontana a 10% admixture of low ash coal brought from the Eastern Regions with 90% locally available inferior coal was used; the cost of coke rose, but blast furnace operations went better and in the ultimate analysis, *i.e.*, the effect upon pig iron costs and upon pig iron out-put, the use of the more expensive coal was beneficial. In deciding whether the use of high ash coke is profitable, factors such as the distance from which the coal has to be brought and the output of pigiron that can be maintained have to be taken into consideration. If a low-ash coal has to come from a distance, and the limited supplies of it available do not permit of high output, the pig iron would prove costlier in spite of the lower coke requirements. The metallurgical coke that has been used in India in recent years has, on the average, a much higher ash content than the coke in general use in the U.S.A. But there was probably one merit in the higher ash. of the Indian coke in use until recently; the ash is very finely divided throughout the coke and this possibly (though not necessarily) strengthens the coke. When present above a certain percentage, ash makes a coke unstable, but, within limits, finely divided ash may add strength. As between two cokes with 5% and 10% ash respectively, the latter might possibly be stronger

"But coal with a low content of finely divided ash is becoming scarcer in India and deliveries to the iron and steel works latterly have been of high-ash coals with also adherent slatey bands of ash. While finely divided ash cannot be removed without resort to expensive processes, the adherent bands can be eliminated by washing. And this is of great importance in India from the point of view of conservation.

"In Tatas, the quality of the pig iron and of the steel is at present suffering because of the higher ash content of the coke used. It is, of course, true that irregularity can be overcome, but when the ash in Indian coal exceeds 15%, it is hurtful to blast furnace practice and when the ash gets to or over 18% there is serious trouble in blast furnace operations.

"As already stated, coke-oven practice cannot change the quality of the coal that can be used for matallurgical purposes. Salvation in India lies only in the beneficiation of coals by blending and washing. The need for a hard coke is probably greater in India than in the U.S.A., because the iron ore in the latter country is softer by comparison and can make do with a softer coke.

"Mr. Haven stated that no satisfactory general definition of metallurgical coal is possible. The suitability of a coal must depend on the quality of the iron ore but when the latter is known, it is possible (and necessary) to determine the required qualities in the coal.

"Mr. Haven emphasised the paramount importance of reserving the metallurgical coal deposits of India for the use of the iron and steel industry. There was, of course, an equal need for decreasing the coal requirements of these works by continual improvements in blast furnaces and coke-ovens and adjustments have been made enabling them to use inferior raw materials (*e.g.*, coal and iron ore).

"For many years in the U.S.A., beneficiation of coals was the concern of the consumers, but latterly, with a demand for exact specifications of the coal sought to be sold, there has been a shift of responsibility to the producers of coal, which they now show willingness to assume."

Mr. Haven's views substantially bear out the contentions of the iron and steel works and will, we trust, help to remove many misconceptions on the subject. We would draw attention in particular to his views regarding the ash content of coking coal needed by the iron and steel works and the consequences flowing from an increase in ash and of the importance of coal washing to the Indian coal situation Our consideration of washing bears out Mr. Haven's conclusion on this subject and it is, therefore, satisfactory to note that at least one iron and steel company is going ahead with the installation of washing plants at its collieries.

But a good deal of further preliminary work has to be done and this will have to be one of the first tasks of the Fuel Research Institute.

10. We have so far dealt with washing in its reference to coking coal only. Mr. Treharne Rees had, as long ago as 1920, emphasised the need for coal washing in general as the most suitable method of standardisation. In other countries, coal washing is now general and it is unlikely that India can for long afford to lag behind. As time goes on, consumers will increasingly demand uniform specifications in the coal they get. The washing of coal will, therefore, grow in importance and the coal mining industry will have to provide itself with necessary facilities. But this is a long-term project in view of our inadequate or non-existent knowledge of the suitability of different coals for washing. In any case,

washing as a general practice in the industry must take its place behind washing for the needs of the metallurgical industry. We have considered how best this objective can be secured. The initiative displayed by the iron and steel industry is not adequate, for washing if it is to provide an answer to our coking coal situation, must be more widespread and, from the nature of things, be practised at the producing collieries. Once the possibilities of different seams have been determined, it may become necessary, subject to safeguards for avoiding hardships, to ensure that the coal output from suitable seams is washed before despatch. The possiblity of installing central washing plants, serving a number of small collieries which may be unable, for financial reasons, to own their own plants, may also have to be considered.

11. To return to our main theme, we have to consider a situation in which the future of our iron and steel industry seems dependent on coal resources of the order of 1,250 million tons. The ouput of coal in the Jharia field which has the main coking coal resources has on an average been about 12 million tons per annum. Practically all of this has come from the seams containing good coking coal and coal which may have possibilities for washing. In 1945, collieries in the Jharia field which were despatching coal to the iron and steel works or whose output was considered suitable for such despatch raised nearly 7 million tons of coal. Allowing for losses in extraction, etc., this would mean an annual exploitation of approximately 9½ million tons of coal. To this may be added another 400,000 or 500,000 tons of coal exploited from the Ramnagar and Laikdih seams of the Raniganj field. On this basis, our resources are being depleted every year by about 10 million tons of coal suitable for metallurgical purposes, either in its original form or by washing. The Coal Mining Committee, 1937, realised the danger of such exploitation, but for the reason primarily that it was for the iron and steel works themselves to safeguard their future by proper action recommended that no interference by the State was necessary. The Committee were also influenced towards this decision by the then reckless behaviour of the iron and steel works, who were exploiting their reserves of good coking coal for purposes of sale rather than for their own use; in this matter, there has been a definite change in the policy of the iron and steel works in the last ten years and the charge of imprudent exploitation can perhaps no longer be levelled against them. On the first issue, we do not share the views of the Committee that the safeguarding of metallurgical coal resources is the duty solely of the iron and steel works. The prosperity of a country and its industrial future depend to a very large extent on a sound iron and steel industry of sufficient magnitude, and it is a national duty to ensure its continued existence. The production of steel in India is infinitesimally small compared to the needs of her population. With almost unlimited resources of high grade iron ore, the potentiality of expansion is great. But expansion cannot obviously be ushered in in a state of nervousness and uncertainty about supplies of this vital material. There is a compelling force behind the figures of our resources and it is essential so to order the use of our limited resources that they provide a sound foundation on which to base our industrial future.

12. Let us then consider how we have been using our output of coal suitable for metallurgical purposes. In Chapter IV, we gave figures indicating that, in a typical month, 1,000,526 tons of coking coal, of which nearly 650,000 tons were of Grade I and above had been despatched as follows :—

	Grade I and above	Rest
	(tons)	(tons)
Railways	283,590	178,794
Iron and steel works	175,419	4,914
Bunkers and exports	31,753	273
Others	155,854	178,929

On a *pro rata* basis despatches of Grade I and above coking coal to these four categories of consumers per annum would be as follows :—

	(tons)
Railways	3,403,080 per annum
Iron and steel works	2,105,208 per annum
Bunkers and exports	381,036 per annum
Others	1,870,248 per annum

So far as we know the only uses for which good coking coal is essentially required are in iron and steel works for blast furnace use and coke ovens for the manufacture of hard coke. The above figure of despatches to the iron and steel works (with the addition of the other coals despatched) compares closely with the total of 2,155,566 tons of Grade I and above coking coals received by the Tata Iron & Steel Co. and the Indian Iron & Steel Co. in 1945. It would, therefore, be reasonable to take the figures of annual consumption arrived at above as a reasonable basis for further discussion in this matter. Despatches of coking coal to coke ovens for coke manufacture in 1945 were about 280,000 tons; no figures are available of the coal coked in bee-hive ovens and other small units, but we may roughly take the figure of about 120,000 to 140,000 tons. In 1945, therefore, the total coal despatches to consumers whose need for good coking coal is beyond dispute is approximately 2,600,000 tons, as against probable total despatches of such coal in that year of over 7½ million tons. In addition, a certain amount of good coking coal is being used by the collieries producing it for power and other purposes, but to estimate this is difficult. Present practice in the matter only lends force to our view that greater electricity facilities should be made available in the coalfields.

13. The data for estimating essential future needs of good coking coal have been given in an earlier chapter. The immediate needs are 2,930,000 tons for iron and steel works, and 537,000 tons for coke ovens and other small consumers, *i.e.*, a total of 3,467,000 tons. From 1948 may be added a further 800,000 tons for iron and steel works, approximately 269,000 tons for coke making for the Sindri Fertiliser Factory, and another 240,000 tons for the coke ovens, *i.e.*, a total of 4,776,000 tons. From 1954 or so, there is likely to be an additional demand of about 1,000,000 tons for the expanded iron and steel industry, making a total of 5,776,000 tons. In this computation, we have assumed that the Sindri Fertiliser Factory necessarily requires hard coke of superior quality. We have been advised that it is possible to avoid the use of superior quality hard coke in the manufacture of Ammonium Sulphate and we have already suggested to the appropriate quarters that the feasibility of doing so should be investigated ; but, meanwhile, in view of the national importance of the Fertiliser Factory, we have accepted this demand as one that must necessarily be met. If this eventual total demand were all met by good coking coal, the present resources of 750 million tons would last for about 100 years after allowing for losses in production, etc.

But, as we have stated earlier, it is essential that the full possibilities of clean ing and blending should be developed. The plans of one iron and steel company suggest that certainly half a million tons per annum, and perhaps more of washed coal will be available for metallurgical use in the next few years and it may not be over-optimistic to assume a figure of one million tons per annum from 1954. Blending may be expected to reduce the requirements of good coking coal by at least a million tons per annum, and we thus arrive at the following result :—

	(million tons)
Requirements from 1954 of untreated good coking coal	3·7
washed coal	1·0
coal for blending	1·0

Taking the first two together, the available resources of 1,250 million tons should, after allowing for losses in production, last for over 200 years ; but this does not take into account any further growth of the iron and steel industry and of other essential consumers of coking coal. Nevertheless, the picture is less depressing than it is under existing circumstances.

14. It will have been noted that about 5 to 5½ million tons of good coking coal are now being used by consumers other than the iron and steel works. Less than ½ million tons of this is being consumed by coke ovens whose need for good coking coal has been accepted. The railways take the largest quantity, approximately 3½ million tons per annum. We tried to find out during the oral examination of the representatives of the Railway Board as to why good coking coal is considered essential for locomotive, but we failed to get a satisfactory explanation. Indeed, the bulk of the other evidence produced before us points to the undesirability of the railways burning good coking coal in their engines, bearing in mind in this connection the distinction bewteen coking and caking coals. This, and the needs of the railways are well brought out in an extract from a note given to us by an officer with experience in fuel matters :

> " All bituminous coals cake to some extent. Those of them which, during coking, produce a hard dense coke are described as metallurgical coking coals. The remainder are simply caking coals Gas coals. are an example of the latter.
>
> " The spaces between the fire-bars of a locomotive are generally of the order of ½" or ¾". Consequently, it is not desirable to feed on to the fire coals smaller than that. I understand that the railways prescribe coal over 1", because they fear that the under-size will fall through between the fire-bars. Now that is one reason why a *caking* (but not necessarily coking) coal is desirable for use in all fire boxes of the standard fire-bar type. If an attempt is made to begin the fire with small coal, even of the caking type, it will of course, all fall through between the fire-bars. Even in using coal of a larger size than the fire-bar space, it is desirable to have a certain amount of caking property ; otherwise the coal disintegrates somewhat, in which event if it were a non-caking coal unburnt portions

would fall through between the fire-bars, whereas if it is a caking coal the separate particles or lumps fuse together forming larger aggregates. The point of this argument is that caking power may be desirable but that does not mean that *metallurgical coking* coal is necessary. It is not so much the coking power as the length of the flame that may be of importance.....".

We should not be understood to say that the railways do not require good quality coal. Their need for such coal is undoubted for running fast express and main trains ; but even for such use, good steam coal and the caking coals of Raniganj can give efficient service. On this point, we collected valuable evidence from a number of railways during our tours. Asked if the 20,000 tons monthly of Bengal/Bihar coal which they were anxious to get need necessarily be coking, the representatives of the Great Indian Peninsula Railway replied in the negative ; what they are primarily interested in is a coal with sufficiently low ash content and sufficiently high calorific value. The Madras & Southern Mahratta Railway have been able to run their mail and passenger services satisfactorily on Talcher and Singareni coal, and in the coal they need for mail and passenger services low ash content and calorific value of 10 to 12 thousand B.T.U. are stated to be important. Similarly the South Indian Railway can run their important services satisfactorily if steam coal of the calorific value of 7,300 to 7,500 calories and ash content below 17% is supplied. These three railways in our opinion, have all varieties of operating conditions including some very heavy gradients and we have no hesitation in believing that their evidence in regard to the need for coking coal is sound. We find confirmation also in similar expressions of opinion by the Bengal Nagpur Railway, who have stated that they do not essentially require coking coal but welcome the features of low ash and volatile contents and high calorific value that are generally found in good coking coals. If suitable non-coking coals can be made available, there would be no serious objection to eliminating supplies of good coking coal for locomotive use. The East Indian Railway were reluctant to express a decisive opinion in the matter ; while indicating a general preference for coking coals, they were not prepared to say whether other suitable coals should serve their purpose equally well. On the whole, we feel that the insistence of certain railways on getting good coking coal is more due to a reluctance to change over from long established practice than to any technical difficulties of operation. Provided it is conceded, as in our opinion it must be, that the railways do need good quality coal for certain services, we think that, on the merits of the case alone, there can be no objection to the elimination of coking coal supplies to the railways. The need for eliminating such supplies arises from a consideration of our reserves of coal suitable for metallurgical and allied purposes. Even had the prospect of coal supplies for the iron and steel industry been brighter than it actually is now, the desirability of replacing good coking coal in locomotives boilers would have been manifest enough from a consideration of the waste that occurs. But in the context of low resources of good coking coal the case against its use by the railways becomes overwhelming. Equally, we see no reason for continuing to supply good coking coal for bunkers, or to those consumers, excluding coke ovens, who in 1945, probably got over 1¼ million tons of good coking coal. The first step in the reservation of coking coal primarily for the iron and steel industry should, therefore, in our opinion, be the cessation of supplies of such coal to—

(*i*) the railways,
(*ii*) bunkers and exports, and
(*iii*) consumers other than coke ovens ; the Sindri Fertiliser Factory is an exception but its requirements of hard coke will probably come from own coke ovens.

The views we have expressed in a previous chapter on the export of coal from India are thus subject to the condition that no coking coal of good quality shall be exported unless special justification is shown in respect of small essential requirements in our natural markets.

15. The estimated essential requirements of good coking coal in the next few years have been shown to be as follows:—

Immediately	3,467,000
From 1948	4,776,000
From 1954	5,776,00

These should, however, be reduced by increasing resort to cleaning and blending and we have stated that the aim should be to restrict the use of untreated good coking coal to about 4 million tons from 954. The present output of such coal is probably in the neighbourhood of about 8 million tons per annum and it must be considered whether an immediate restriction on the use of such coal by other than specified types of consumers should be imposed, calling, in its turn, for an appropriate curtailment in output. On this point we must take the view that in the absence of sufficient outputof other suitable coals and with our increasing requirements, it will not be practicable to enforce immediate restrictions, save in the case of the coal required for export and bunkers, if we desire to follow up and maintain the projected industrialsation programme. Restrictions can be imposed only gradually as and when the output of other suitable Indin coals is increased sufficiently to supply the needs of consummers who are to be denied the use of good coking coal.

16. The steps to be taken to attain the reduced level of output, when practicable, may now be considered. For all practical purposes, the principal producers of good coking coal are the collieries of the iron and steel works and the market collieries ; the former produced in 1945 approximately 1·4 million tons of coal. We have ignored the output from Giridih, as the remaining life of the railway colliery there is small. It is certain that the adoption of large scale sand stowing, in any case in mines producing good coal, will slow down output in the early stages in certain cases, but the exact effects cannot be estimated. Meanwhile effective steps must be taken to ensure that collieries of not increase their output of such coal. The first action therefre, is to freeze the output of good coking coal at its present level ; and this naturally includes a control over the opening of new workings in good coking coal seams. For this purpose, the coal in seams 12 to 18 of the Jharia field and in the Ramnagar and Laikdih (portion) seams of the Raniganj field need only be considered, allowance being made, in the case of the Jharia seams, to the obviously inferior buality of the coal being raised simultaneously in certain portions. Within the next 5 years a detailed survey, including chemical and physical analyses of the coal in the collieries in the Jharia and Raniganj fields should be completed with a view to determining which collieries are producing—

(*a*) good coking coal, and

(*b*) coal which, by washing, could be made into good coking coal.

We would then-be in a position to estimate accurately the output at the frozen level of good coking coal and decide to what extent restrictions will be nesesary. Obviously a system of output quotas will have to be adopted and these quotas be fixed having reagrd to production capacity and the state of the workings in a mine. The position of the collieries owned by the iron and steel companies deserves, however, special consideration. These collieries have been acquired by th steel companies primarily to ensure a continuity of supplies and as reserves for the future. When good coking coal is reserved for metallurgical use, the danger of uncertain and interrupted supplies from market collieries will become negligible. We, therefore, suggest that detailed investigation be made for the porpose of placing restrictions as soon as possible on the output of good coking coal in collieries owned by the iron and steel companies. Simultaneously, the steel companies should earnestly pursue their experiments on the blending and washing of coals; and should also, we think, take a further and important step towards lengthening the life of the country's coking coal reserves. It has been their practice to work to as low an ash percentage as possible, 15% or under, in their coals. and our suggestion is that they should in future work instead to a standard ash percentage of not below 17% even though this may mean a higher cost of production. By doing this, they will widen the range of combination and thus be enabled to take advantage of higher ash coals than was possible under their old system. For example, a blend givin 15% average ash means coals from say 12% to 18% ash, but a blend of 17 average ash means a range from 12% to 22% a tolerance of 4% in ash with which to increase our reserves. The steel companies have actualy been working at about the average ash we suggest during the war owing to difficulties of coal supplies, but we presume that they wish to revert to a lower average ash as soon as they can in the interests of more efficient operation. But in view of the imperative necessity of conserving the country's limited coking coal resources, primarily for the benefit of the steel industry , we consider that that industry should in return adjust its practice to make the fullest use of the coals thus conserved. The proposed average of 17% ash will, according to our information, produce a coke which is within the safety line for blast furna ce practice.

17. In regard to the conservation of metallurgical coal from the point of view primarily of use, the various steps we have in mind are—

(*i*) freezing the output of good coking coal on a rough and ready basis, and control over the opening of new workings in good coking coal seams,

(*ii*) forbidding supplies for exports and bunkers,

(*iii*) such an ordering of our interim control measures that essential requirements of good coking coal are met first.

(*iv*) subject to further examination, curtailing the output of good coking coal in the collieries of the iron and steel companies,

(*v*) a determination by a detailed survey of the collieries producing good coking coal, and

(*vi*) fixation of quotas of output for collieries determined under (*v*).

When output has been stabilised, despatches by collieries of good coking coal will be against licence and only to iron and steel works and coke evens. The study of washing possibilities meanwhile will help to decide to what extent suitable seams need to be reserved for metallurgical use ; as we have stated earlier, it will probably then become necessary to regulate the output from such seams, to enforce the washing of certain coals and to reserve them for metallurgical and other approved use.

Should a restriction of output in market collieries become necessary, hardship may be caused by way of either higher production costs or the cost of unproductive protective measures; and claims for compensation may follow. We do not think it necessary at this stage to lay down any formula for meeting this situation; the matter will have to be dealt with by the appropriate authority when the time for restriction comes, which may not be for some time, and the extent of thehardship caused, if any, can be gauged; but we recrod our view that if hardship is caused to producers of coal, they would have a claim for sympathetic consideration.

Conservation of other Coals.

18. We now turn to a consideration of the case for conserving in use other superior coals. These, as stated earlier, can be divided into low volatile and high volatile coals. The reserves of low volatile superior coals are comparatively limited, but other than the railways' needs of such coal as a possible replacement of the good coking coal they are now getting, our attention has not been drawn to any essential need which would justify action for the reservation of such coals. High volatile coals on the other hand have important uses, *e.g.*, as a basis for chemical industry. Large quantities of such coals are now being burnt for steam raising and it has been argued that they should be preserved for providing a sound foundation for large-scale development of a chemical industry. As against this, however, our resources of high volatile superior coals are considerable. The reserves in the Raniganj field alone are over 1,300 million tons and there are comparable reserves in the Talcher, the Central India and Central Provinces coalfields. The newly discovered deposits in the Karanpura field swell the reserves yet further and we are, on the whole, and particularly because of the other proposals as to conservation that we are about to make, not disposed to be anxious about the future essential requirements of high volatile coals. No case, at any rate in the present circumstances, exists for enforcing any restrictions on the use of such coals. It would, however, be wrong to assume that no attempt will be necessary in the future to limit or regulate the use of good quality high volatile coals. The aim of fuel research is to secure the most economical and efficient utilization of resources, having regard to all relevant factors, and we can foresee possible developments. When our coals have been thoroughly studied, and when more complete data are available in regard to consumer requirements, a partial or total regulation of the use of coal may become essential in the interests of scientific utilisation. The tendency of a consumer is generally to attempt to get the best, even though the best may not be necessary for his particular purpose. In such a case, an enforced change in fuel practice might become necessary, but the objective would primarily be proper utilisation and, only in a minor degree, the conservation of good coals. We shall deal with this question in greater detail in a subsequent chapter.

Avoidance of Waste in Mining.

19. We have hitherto considered the conservation of superior coals in use. On the question of avoidance of waste in mining, until about 10 years ago the average recovery of coal in India was stated to be only 50 per cent. There has been an improvement in this matter in recent years, but the position is far from comparable with that prevailing in countries in which the objective in coal mining is to achieve the maximum possible extraction. The low rate of extraction in India has been ascribed by the Coal Mining Committee, 1937, to the following causes:

(*a*) Mining methods which are bad under all circumstances, *e.g.*, too high a percentage of extraction in first working and enlarging galleries or reducing pillars too much in advance of systematic de-pillaring.

(*b*) Mining methods which have been forced on the trade and industry by economic conditions, *e.g.*, section-working involving the sacrifice of coal of commercial or industrial value.

(*c*) Circumstances over which the mining community has little or no control, *e.g.*, coal lost as support under railways or other surface features and in excessive barriers due to crooked boundaries or small leaseholds or geological disturbances, such as faults.

Dealing with these causes, the Committee recommended that—

(*i*) as regards (*a*), principles of first working, which would prescribe the sizes of the pillars and galleries and the manner in which de-pillaring may be done, should be laid down in the Mines Act,

(*ii*) as regards (*b*), a regulation should be framed which would require that the lay-out of projected workings of all seams which are being worked or are due to be worked in more than one section should be submitted to a statutory authority for approval before coal-getting is done, so that the authority could determine not only in which section the seam should be worked, but also the order in which the various sections should be worked,

(*iii*) as regards (*c*), the coal under railways and other surface features should be allowed to be extracted with stowing, and provision should be made for the amalgamation of small properties, the adjustment of irregular boundaries and the transfer of isolated coal-bearing areas and the working of abandoned mines.

(*iv*) as a measure of safety and conservation, rotation working should be enforced, so that an overlying seam or section of a seam of relatively inferior quality is not destroyed or damaged during the de-pillaring of a superior underlying seam or section of a seam, and

(*v*) most important of all, stowing should be adopted as the prime remedy for securing safety in mines and the conservation and eventual extraction of the maximum amount of coal.

20. It is interesting to note that the Coalfields Committee, 1920, had also recommended the framing of rules which would prescribe—

(1) the dimensions of pillars and galleries and the method of de-pillaring operations,

(2) rotation of working,

(3) the dimensions and provision of barriers,

(4) the isolation of workings, and

(5) control over the extraction of coal under land acquired for the railways.

Due to the failure of Government to take action, many of these earlier recommendations had to be repeated by the Coal Mining Committee, 1937. Since 1937, however, the Government of India have framed regulations concerning the principles of first workings and de-pillaring and have also enacted a Coal Mines Safety (Stowing) Act to implement some of the recommendation of the Coal Mining Committee in regard to stowing. But no legislation has been undertaken in the matter of rotation of working, and little has been done in respect of the extraction of coal underlying railway lines and adjustment

of boundaries. We shall revert later to the limitations of the Stowing Act. Earlier, we have expressed our view on the Coal Mining Committee's commots on section-working as arising from the operation of the Coal Grading Board Act.' Questions such as the adjustment of boundaries and the amalgamation, of small properties will be considered in later chapters. Here we shall concentrate on the following questions which have a bearing on mining methods and practice and which are related, in turn, to the question of conservation :

(*a*) adequacy or otherwise of the present mining regulations,

(*b*) stowing,

(*c*) rotation of working, and

(*d*) extraction of coal under railway lines and other surface features.

Present Mining Regulations.

21. With regard to (*a*), there is a unanimity of opinion that, under existing circumstances, the present Mining Regulations in their reference to first working, section-working and de-pillaring have proved beneficial. The greater safety of the workings in recent years and the possibilities of larger eventual extraction are undoubtedly due to regulations which prescribe proper sizes of pillars and galleries and the manner in which de-pillaring may be done. There is, however, a similar unanimity of opinion that the present regulations are designed merely to protect the workings in the first stages of operations and to prevent premature collapses during de-pillaring. They do not provide for methods of maximum recovery and to this extent do not help to secure the maximum possible extraction. Such extraction is possible only if their gulations have the dual objectives i f the safety of workings and the conservation of coal resources ; these two objectives can be achieved only if de-pillaring is done with stowing.

Stowing.

22. As regards sand stowing, though the Coal Mining Committee, 1937, were primarily concerned, because of their terms of reference, with safety in mines, they saw the close connection between safety and conservation. Their consideration of our resources of good quality coals emphasised the importance of conservation and they appreciated clearly the bearing of stowing on safety in mines and the preservation of limited resources. But the requirements of sand stowing for achieving the two objectives would be very large and would take time to arrange. In the meanwhile, therefore, the Committee considered that sand stowing (with assistance) should begin first in areas, conditions and seams—

(*a*) where there is urgent and immediate danger to the life and safety of persons employed,

(*b*) where there are fires in closed down collieries,

(*c*) where pillar extraction, though necessary at the moment to maintain output, cannot be undertaken because it is likely to cause crushing or premature collapse or is likely otherwise to endanger a mine and so to involve serious avoidable waste of coal,

d) where coal of commercial or industrial value will be immediately lost or rendered inaccessible in the seam or adjacent seams or under railway lines, village sites, etc.,

(*e*) where, though pillar extraction is no immediately necessary, areas standing under weak pillars require to be stabilised in order to facilitate subsequent recovery with or without stowing, and

(*f*) where the formation or strengthening of protective barriers between mines or sections of mines is necessary.

In addition, all collieries which were already stowing voluntarily should be encouraged to continue and were to be assisted to the extent of the actual cost of extracting, loading and conveying sand to the pitmouth. Collieries wishing to start stowing voluntarily in future would be required to submit their plans and estimates for deciding the most equitable terms on which stowing should be assisted. The Committee thought that the requirements of stand for stowing in the beginning would be about 10 million tons per year, of which 6 million tons would be for the Jharia field and 4 million tons for the Raniganj field. The extent of the assistance to be given to collieries required to stow or undertaking voluntary stowing should not exceed the cost of supplying sand free at the collieries and the expenditure would be met out of a fund created by the levy of a cess at the rate of 8 annas and 12 annas per ton respectively on coal (including soft coke) and hard coke despatched by rail from the coalfields. If experience showed that a larger measure of assistance was necessary, there would have to be a corresponding increase in the cess rate proposed. Arrangements for the supply of sand were to be in the hands of a public company in which Government would hold 51 per cent. of the capital.

In considering the recommendations of the Committee, it must not be overlooked that the Committee attached importance both to safety and to conservation, though conservation was not contemplated as applying to any particular grade of coal but rather to working conditions in mines pregnant with the danger of collapses and fires.

23. The final decisions of the Government of India on the recommendations of the Committee are embodied in the Coal Mines Safety (Stowing) Act. But before we come to its provisions, we have considered it worthwhile to reproduce the following extract from letter No. M.955, dated the 7th July 1938, addressed by the Government of India to Provincial Governments:

> "In passing to the question of statutory measures for the conservation of coal supplies, more difficult issues have to be faced. No one questions the necessity of protecting human life and safety or the justice of compelling mine-owners to take the steps necessary for that purpose. But the need of conserving the supplies of coal and the justice of controlling the mine-owners' practices for this end have both been called in question. The Committee's view of the importance of conserving coal supplies rests on their conclusions regarding the extent of the reserves. They estimate that at the present rate of production and with present methods of extraction the reserves of good quality coal, *i.e.*, selected and first Grade coals, will last 122 years, and the reserves of coking coal will last 62 years. On the other hand the Committee find that the reserves of inferior coal 'are practically unlimited' and with altered market conditions, these could be largely substituted for superior coals. There is also the question of the extent to which sacrifices should be made for posterity, particularly in view of the probability that future generations will have further scientific resources at their command.
>
> "In spite of these considerations, the Government of India feel that statutory intervention for the purpose of conservation is desirable. The coal resources of the country represent an irreplaceable asset; and in the absence of revolutionary discoveries affecting the supply of energy they are likely to remain an asset of great value. Recourse to inferior coals is possible for most purposes, but not without a loss of efficiency,

and it is likely that long before the time at which the better coals are exhausted, their diminution and the increasing depths at which they must be won will operate to enhance the costs of industry. Further when coal is lost, the waste is not confined to fuel ; there are by-products of which future industrialists may make great use. Finally, the benefits of conservation are not likely to be deferred to a distant future. The Committee comment on the very short views taken by the coal trade ; but this attitude has been forced on many by the competition in the coal market. The extensive employment of wasteful methcods of extraction resulted in prices which made it very difficult for those who wished to conserve their resources to sell coal. The elimination of such competion as is dependent on a resort to wasteful methods should produce an immediate benefit for the industry as a whole by securing or maintaining prices which would go far to make sound methods profitable. Consumers would have to pay higher prices than those which have prevailed in the past ; but they must otherwise face the prospect of paying more heavily at no distant period on account of the waste of coal.

" If it is agreed that the State should intervene to secure better conservation of coal supplies, the question which arises is that of the method to be pursued. The Committee recommend the application of compulsion together with financial assistance. It is not clear whether by compulsory stowing the Committee mean that the mine-owner who was ordered to stow would be obliged to do so, or whether he would have the option of discontinuing extraction ; but in either case the possibility has to be faced that he would be put to loss in the interests of the community of the future. The Committee dwell exclusively on the interests of the community, and the majority do not refer to the possibility that equitable claims for compensation would arise. If it were reasonably certain that conservation would, with the assistance proposed, prove not unprofitable to the industry as a whole, the application of compulsion without compensation would be justified ; but the Government of India are not sure that this is at present true, and if the same end could be secured without coercion, this course would be preferable.

" There are other grounds for avoiding the coercion of individual coal-owners, at present at least. For, as the Committee recognise, stowing cannot be enforced generally at the start, and it seems probable that safety requirements will make such demands on stowing material as to keep any organisation that may be set up fairly fully occupied, while any surplus that it could spare would, if reasonable assistance were given, be taken by coal-owners who are willing to resort to stowing. It is important to remember that stowing undertaken for safety purposes will itself secure conservation of coal, and that other steps recommended by the Committee will work in the same direction. In particular, the control which they wish to introduce over the dimensions of galleries and pillars should have important effects in preventing further waste ; these proposals have already been embodied in draft regulations and published for criticism. Thus, for the first few years at least, coercion is likely to yield no better results than can be obtained without it while the experience gained will afford a sound basis for more drastic action if this proves necessary."

The Government of India were obviously not prepared to undertake slation for securing the conservation of coal resources by stowing save

to the extent that conservation would be achieved by stowing undertaken primarily in the interests of safety. The following extract from the Statement of Objects and Reasons accompanying the Coal Mines Safety (Stowing) Bill introduced in 1939 is also of interest :

> "The recommendations of the Committee have been examined by the Government of India in consultation with the Provincial Governments and interests concerned. The Government of India feel that, for the present at any rate, the main objective of any proposal should be to secure the safety of the worker. Such proposals would incidentally result in a certain amount of conservation, but safety should be the primary objective. The Bill is designed to give effect to these proposals."

24. In pursuance of the Act as passed, a Coal Mines Stowing Board was created from the 1st November 1939. Under the rules framed under the Act, the Board have authority to grant assistance for the following purposes :

(*a*) for stowing or other protective measures which are required to be undertaken by an order issued by the Chief Inspector of Mines in India under Section 9(3) of the Act ;

(*b*) for any protective measures essential for the effective prevention of the spread of fire to or inundation by water of, any coal-mine from an area adjacent to it ;

(*c*) for stowing operations voluntarily undertaken in the interests of safety ; and

(*d*) for research connected with safety in mines.

Expenditure under the heads " compulsory stowing " and " protective works " has statutory priority over expenditure on other forms of assistance and the order of priority among coal mines for assistance towards voluntary stowing is to be determined by the Board according to the degree of urgency of stowing from the point of view of safety. To start with the Board decided that expenditure on compulsory stowing and protective works should be met in full and that as regards voluntary stowing the quantum of assistance to be granted should be limited to the actual cost of supplying stowing materials at the pithead. Temporarily, from 1943-44, assistance towards voluntary stowing was subjected to an overall maximum of 4 annas per ton of stowing material supplied, but it has since been raised to 6 annas per ton, or the actual cost of sand at pithead, whichever is less. The following table gives the cess collections at the rate of 2 annas per ton on coal and soft coke and 3 annas per ton on hard coke and the expenditure on protective works and compulsory and voluntary stowing for the years 1940-41 to 1943-44 :

Year	Cess collection	Protective works	Compulsory and voluntary stowing
	Rs. A. P.	Rs. A. P.	Rs. A. P.
1940-41	9,36,408 0 0	1,14,719 0 0	..
1941-42	29,90,790 0 0	2,86,914 5 0	1,94,051 13 0
1942-43	27,50,389 14 0	1,56,696 12 0	3,02,883 6 0
1943-44	23,88,864 13 0	1,85,635 0 0	6,46,830 6 0

The closing balance on 31st March 1944 was over Rs. 63 lakhs. The action taken by the Stowing Board on protective works has undoubtedly been beneficial, but the number of cases in which compulsory stowing has

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been enforced has not been large. Approximately 1·2 million and 1·6 million tons of coal are now being raised in the Jharia and Raniganj fields respectively with stowing. The expenditure of the Stowing Board has been small since the Board have been handicapped by sundry difficulties such as labour shortages and the acute position in regard to supplies of plant and equipment during war-time.

25. In 1939, the Government of India were not prepared to enforce stowing in the interests of conservation, though a strong enough case had been made out. Even had a contrary decision been taken, it is improbable that much more could have been achieved in the difficult war years that followed. But these years have undoubtedly helped to bring about a practically complete unanimity of opinion in the industry about the need for enforced stowing on a much larger scale. General considerations have also been responsible for this shift of opinion ; the need for conserving the country's resources of good coal, in particular, has been more fully appreciated against the background of plans for large-scale industrial development. We have, therefore, found ample support for the conclusion that there will have to be a very considerable increase in stowing in the near future. The objective of safety will, of course, remain. In addition, stowing will be necessary to achieve the conservation of coal resources which will otherwise be lost during de-pillaring operations and to enable the extraction of valuable coal areas in which development work is now complete. Stowing for conservation will also make possible the extraction of coal now locked up under railway sidings, trunk roads and other important surface features.

26. The following questions arise for consideration :—

(*i*) in what cases should stowing for conservation be enforced ;
(*ii*) should such stowing be assisted and if so how and to what extent ;
(*iii*) what arrangements require to be made for the increased sand stowing in view ; and
(*iv*) administrative arrangements.

27. The nature of our coal resources clearly indicates that the conservation, to the maximum possible extent, of our reserves of good quality coal is of utmost importance. While we have stated that, for the present at any rate, the conservation in use of other than good coking coals is not called for, there can be no two opinions on the point that mining practices should aim at full extraction, as far as possible, of the better quality coals. To leave them in the ground either as support or in goafed areas would entail a loss of the first magnitude. But we do not think that the same considerations need apply in the case of inferior coals, of which our reserves are very considerable. The first principle we would enunciate, therefore, is that measures of conservation should seek to prevent the avoidable waste of coal of and above a certain quality. After careful consideration of all the issues involved, we have reached the conclusion that maximum extraction should be enforced in respect of all coals with an ash content of up to 30 per cent. The principal measure we have in view for effecting maximum extraction is stowing and accordingly, we come to our second general principle, *viz.*, that the extraction or de-pillaring of seams with an ash content of up to 30 per cent. should be prohibited unless accompanied by stowing ; subject to two exceptions. Firstly, if the degree of extraction in a mine has been so excessive as to make stowing an uneconomic proposition or other similar considerations exist, it may on balance be preferable not to enforce stowing unless such a course is dictated, in the interests of safety of that mine or adjoining properties. Secondly

we do not consider that stowing should be insisted upon in thin seams when extraction does not endanger overlying coal of preservable quality. Obviously, the objective we have placed before ourselves cannot be fully achieved until there has been a complete survey of all seams with a view to determining ash content, amongst other things. This may take about 5 years, but meanwhile we see no reason for not enforcing stowing for conservation in the following cases, if stowing is not already being done:

(*a*) collieries working coal graded by the Coal Grading Board as being of Grade II quality and above in the Bengal/Bihar fields; and

(*b*) collieries not graded by the Board but working seams 12 to 18 of the Jharia field and the Ramnagar and Laikdih seams of the Raniganj field, provided the coal is known to be of good quality.

One point needs clarification. The conservation of coal with an ash content of up to 30 per cent. implies that an underlying seam with a higher ash content should not be so worked as to damage or destroy an overlying seam with ash up to 30 per cent. and, so, stowing may, in some cases, be necessary in respect of inferior coals also, if this cannot be avoided by working to an orderly sequence of extraction. What we have stated should not be understood to imply that we want any diminution of stowing for safety as now being enforced. On the contrary, that must continue irrespective of the quality of the coal, but it may prove to be the case that the extension of stowing as envisaged by us, even in the first stage, will embrace enforced stowing for safety to some extent.

28. A certain order of priority for enforcing stowing operations is necessary, in view of the difficulty of making full arrangements in reasonably quick time. For this purpose, we make the following recommendations:—

(*a*) First priority should be given to the Jambad-Kajora-Toposi group of mines in the Raniganj field; most of these have completed or nearly completed their development work and some are depillaring by isolating the areas concerned. The seams are liable to spontaneous heating and sand stowing will increase total output from the developed mines. Sand requirements in the early stages will be about 5 million tons per annum.

(*b*) Next in importance is the application of stowing in portions of seams from No. 12 upwards of the Jharia field in which spontaneous heating and fires are likely to destroy good quality coal or renders its eventual extraction impossible. The likely areas are shown in the map attached at Appendix XII, and as between the five areas, priority should be in descending order from 1 to 5. The total sand requirements for all these areas may be about 7 to 8 million tons per annum.

Other areas which seem *prima facie* marked out for sand stowing are the Nimcha-Searsole-Jemihari and the Jammeria-Banksimulla-Baraboni areas in the Raniganj field and the Bokaro and Karanpura fields, during the extraction of thick seams. We are aware, too, of plans for introducing sand stowing in Central India and Talcher State. But, as we have stated earlier, a comprehensive plan for sand stowing can be drawn up only after the results of the survey of coal seams has been completed. Now, as later, the main considerations to be borne in mind in determining priority of stowing are the quantity of the coal to be conserved, the extent to which mines have

developed and their readiness to de-pillar; the liability of the seams to be extracted to spontaneous heating; the presence of known dangers to be guarded against (*e.g.* fires or old water-logged workings in upper seams); and the safeguarding of important surface structures such as railways, road, etc.

29. It is somewhat difficult to estimate the quantity of sand that will be required eventually for implementing the full plan of sand stowing. We can only attempt a rough guess. If the Bengal/Bihar fields are called upon to produce about 30 to 32 million tons of coal, and assuming a ratio of output of 40% in development work and 60% in pillar extraction, we shall have to provide for the extraction of 18 to 19 million tons of coal with sand stowing. On that basis, sand requirements are likely to be in the neighbourhood of about 40 million tons per annum, exclusive of sand for protective works such as the Jharia and Kusunda fire areas.

The offtake of sand for stowing is at present probably in the region of 5 or 6 million tons per annum. The magnitude of the future task is thus apparent.

30. We now come to the second of the questions connected with stowing, *viz.*, the need for assistance. The Coal Mining Committee, 1937, considered it impracticable to suggest either that the cost of stowing should be met in entirety by the colliery companies themselves or that "since the justification for compulsory stowing is the national interest, the State should bear the whole cost and distibute it over the whole country." But the proposal which had a general measure of support and was accepted by Government was that stowing should be assisted from the proceeds of a general cess on coal and coke despatched by rail from British India (excluding Assam and the Punjab). Nothing has happened in the meanwhile to justify any change of views in this matter. Nor is it really necessary to consider afresh the question as to whether the cess should be confined to good quality coal; the Coal Mining Committee considered and rejected the idea for very sound reasons. Our recommendation about a more wide-spread enforcement of stowing will undoubtedly benefit a much larger number of collieries. We have also reviewed the rejection by Government of the Committee's proposal to make royalty receivers share in the cost of stowing and have reached the conclusion that no change is necessary. In any case, the matter is not of consequence in view of important proposals we make later relating to mineral rights.

As to the degree of assistance to be granted, the recommendations of the Coal Mining Committee and the practice being followed by the Stowing Board have been mentioned earlier. The Committee, however, added that if "some additional assistance beyond free sand supply is considered necessary, we think that such assistance should be related only to the cost of putting the stowing material in place underground (including overhead charges, depreciation on plant, repairs and replacements) excluding the cost of pumping." Not the whole of the cost of putting the sand underground should, however, be re-imbursed "because the collieries that will need most assistance in this respect are those which have worked least satisfactorily and extracted the largest percentage during first working. The best plan, therefore, would be to have a flat rate based either on the sand put in or the coal taken out. Such a flat rate would cost the cess funds less and would also be an incentive to collieries to do the required stowing as cheaply as is

consistent with efficiency." The following will illustrate in a concrete manner the ideas of the Committee :

Sand required for the extraction of one ton of coal (average)			2⅔ tons.	
Average cost of delivering one ton of sand to colliery (at an average distance of 6 miles)	Re.	0	6	6
Cost of delivering 2⅔ tons of sand—to be re-imbursed in full	Rs.	1	1	8
Cost of underground stowing for 2⅔ tons of sand	Re.	0	14	8
Total cost of stowing per ton of coal extracted	Rs.	2	0	4
Average cost of pumping 2⅔ tons of sand—not to be re-imbursed	Re.	0	8	0
Cost of other stowing processes, *i.e.* Re. 0-14-8 *minus* Re. 0-8-0	„	0	6	8
Further assistance, if any, to be limited to a flat rate below Re. 0-6-8 or say	„	0	5	0 per ton of coal.
Maximum assistance per ton of coal extracted to be limited to Rs. 1-1-8 *plus* Re.0-5-0	Rs.	1	6	8

The assistance definitely recommended by the Committee is about 50% of the total cost ; the maximum assistance that might be granted wouldbe about 70%.

31. The Coal Mines Stowing Board have supplied us with details of the cost of delivering sand at pithead to the collieries that were stowing in 1943-44 and 1944-45 ; these are given in Appendix XIII. It will be seen that the cost of sand at pithead is generally in the region of 6 to 7 annas per ton (including depreciation, repairs etc.) though both lower and higher costs have been incurred in a number of cases. The total cost of stowing per ton of coal extracted, of course, varies with the sand required for packing the void which, in its turn, is dependent on the amount of coal taken out in first workings ; in this connection we would invite attention to the graph and table furnished by the Tata Iron & Steel Co. in their reply to Question 32 of our first questionnaire. For ready reference, we reproduce below the table there given :—

1st Extraction	Final extraction with stowing	Sand put in	Cost of stowing	Cost per ton of coal	Cost per ton of sand put in	Extra allowance for barricade cleaning and cooling etc.
6%	94%	130	159/-	1-11-0·7	1-3-7·06	...
13%	87%	130	167/-	1-14-4·8	1-3-7·06	5%
20%	80%	130	175/-	2-2-10·5	1-3-7·06	10%
30%	70%	130	183/-	2-9-9	1-3-7·06	15%
40%	60%	130	191/-	3-2-10·5	1-3-7·06	20%
50%	50%	130	199/-	3-15-6	1-3-7·06	25%
60%	40%	130	199/-	4-15-6	1-3-7·06	25%
70%	30%	130	199/-	6-10-0	1-3-7·06	25%

Figures supplied to us by certain other collieries of the total cost of stowing per ton of coal extracted are given below :—

Colliery—	Rs.	A.	P.
A	1	4	6
B	1	8	6
C	1	9	0
D	1	9	7
E	1	15	7
F	2	8	1
G	1	9	9
H	1	5	2
I	1	2	4
J	1	2	0

In all cases, the figures are exclusive of an allowance for depreciation and interest on capital; these would increase the total cost by probably 4 or 5 annas per ton. From all the evidence available, the conclusion can be drawn that the total average cost of stowing per ton of coal extracted is Rs. 1-12-0 to Rs. 2-0-0. The amount of sand required and its cost delivered at pithead would, as we have pointed out, depend on the extraction in first workings, but it seems reasonable, on the whole, to assume the average rate of 2 tons of sand at pithead at a cost of 12 to 14 annas, which is somewhat less than 50% of the total cost of sand stowing.

32. It has been strenuously urged upon us that this degree of assistance is totally inadequate and has been the main cause of the unsatisfactory progress of sand stowing. It is alleged that small collieries producing inferior grades of coal find the cost of stowing, which must inevitably be higher in their case, deterrent and that so long as the full cost is not re-imbursed they will be unable to undertake stowing. There is a wide-spread demand for a higher rate of assistance from collieries producing the higher grades of coal also, though they argue that assistance should not be to the extent of the full cost, as the incentive for efficiency would otherwise be destroyed. Re-imbursement, they continue, should be of 75% only of the total cost, a suggestion approximating to the further proposal made by the Coal Mining Committee.

In our opinion, the case for re-imbursing the full cost of stowing is weak. Apart from the consideration of incentive mentioned, we think it would be reasonable to make the colliery owners bear a portion of the expenditure. So long as the price of coal is controlled by Government—and we think that this will be necessary for many years to come—it is possible to secure that some portion of the increased raising costs consequent on sand stowing are borne by the colliery owner. Such a position prevails even now, for a colliery stowing voluntarily and having only a fraction of the cost re-imbursed, earns a lower rate of profit per ton of coal than another similar colliery that does not stow. After careful consideration, we have, therefore, come to the conclusion that enforced stowing should not be assisted to the full extent. Indeed, it has been stated that with the present day prices and the hope that Government will ensure a fair deal to the industry in the future, many collieries can and will stow voluntarily without any assistance whatsoever. On the whole, we think that it will be sufficient if 75% of the total cost of stowing is re-imbursed, subject to a maximum re-imbursement of Rs. 2 per ton of coal extracted. This maximum, it is necessary, to fix so as not to place too high a premium on inefficiency. Each new colliery undertaking stowing will be required to submit a plan of its workings which will show the degree of exhaustion already reached and facilitate an estimate of the probable cost of stowing. If it appears that the cost of stowing in any case will be excessive the power to grant exemptions can be exercised.

Equally, if a colliery has to undertake stowing for protective purposes out of proportion to any assistance to which it may be entitled on a basis of coal raisings, we think that the Stowing Authority should have the power to deal with the matter on an *ad hoc* basis. It should not be forgotten that our object is to promote sand stowing to the greatest extent possible, and that the proposed limits on financial assistance are meant to bear upon the undeserving, not the deserving.

We should here explain why we recommend assistance on a per ton coal extracted basis whereas the Stowing Board are actually working on a per ton sand delivered basis. We feel that if the principle of financially assisting sand stowing from a cess on coal despatches is to be extended beyond stowing for safety to stowing for conservation, it is necessary for the disbursing authority to be able to assess whether the stowing operation is economically worthwhile. So long as safety was the criterion for financially assisted stowing, the factor of economic return did not count, but as soon as conservation of coal enters into the matter, so must this factor ; and it can only, we think, be considered in terms of coal extracted, not sand delivered. We realise that there are practical difficulties in the method, and have for this reason suggested that the Stowing Authority should have latitude to deal with individual cases on an *ad hoc* basis.

There is the possibility that a colliery required to stow may, considering that the assistance to be granted is inadequate, prefer to close down operations. The resulting loss of output may be serious and effective steps must be taken to prevent this and compulsorily enforce stowing. A breach of the order must undoubtedly be treated as an offence, but we would not hesitate to recommend State acquisition and working of such a colliery.

33. The assistance proposed will, of course, be granted out of the proceeds of a cess levied as at present. We have considered whether a cess should be levied on Assam, the Punjab and Baluchistan coals which are now exempt. Stowing is of no importance in these areas and the coals are already selling at a high price compared to those of the rest of India. The stowing cess in the future will have to be considerably higher than at present and if it is levied on Assam, the Punjab and Baluchistan coals also, there would be an appreciable increase in cost to the consumer. The result would be to enhance still further the prejudice against these coals, a result which we consider undesirable in view of the need for stimulating their use locally to the maximum extent possible. We, therefore, recommend that the present exemption should continue ; it will eventually apply to not more than 1 million tons of the total anticipated Indian consumption of about 39 million tons per annum.

We propose also another exemption. In Chapter IV, we stated that the use of soft coke may have to be encouraged by offering a cost concession to the consumers ; and we think that exemption from the stowing cess would be an appropriate way of granting this concession. It would apply indirectly to the 3 million tons of coal we have estimated as the eventual requirement for soft coke manufacture.

The cess will thus be leviable on 35 million tons of coal annually out of the total estimated consumption of 39 million tons. We mentioned earlier that 18 to 19 million tons of coal in the Bengal and Bihar fields alone may have to be extracted with stowing. The all-India total may be 2 or 3 million tons more and, on the basis of assistance at the average rate of Rs. 1-12-0 per ton of coal extracted, the money needed may be about Rs. 3,85,00,000, exclusive of administrative and other expenses. We, therefore, propose that the cess to be levied should be Rs. 1-2-0 per ton of coal and Rs. 1-10-0 per ton of hard coke, in both cases on despatches by rail. The annual proceeds, on this basis, would be just over Rs. 3,95,00,000. But it is equally clear that the full magnitude of stowing will not be reached for some years to come and we propose, therefore, that, for the next five years, the cess should be at the rate of 8 annas per ton on coal and 12 annas per ton on hard

coke. The money accumulated will be applied towards interim assistanc and the very heavy capital cost of providing rope-ways etc. for the transport of sand. At the end of the first five year period, the case for enhancing the cess should be reconsidered, having regard to the developments that have taken place meanwhile.

34. Under the arrangements that must be made as rapidly as possible for this wide extension of stowing must be considered the question of

(*i*) the availability of sand,
(*ii*) the transport of sand, and
(*iii*) the availability of power.

The third point we have dealt with in Chapter VI but would take this further opportunity to emphasise the urgent need for the provision of adequate electricity facilities in the coalfields. The plans for stowing depend to a major extent on the availability of electric power and complacency would be disastrous.

35. The continued availability of adequate quantities of sand in the Damodar, Barakar and Adjai rivers running through the Bengal and Bihar fields is equally vital. The Coal Mining Committee, 1937, quoting Geological Survey of India reports, gave the following figures of the fixed deposits or relatively constant quantities of sand in the three rivers :—

	milion tons
(*i*) The Damodar River between Amlabad Colliery and the extreme end of the Jharia Field	80
(*ii*) The Damodar River in the Raniganj Field	543
(*iii*) The Barakar River in the Raniganj Field	113
(*iv*) The Adjai River in the Raniganj Field	280
(*v*) The Upper Damodar River in the Karanpura and Bokaro Fields	71

In addition, sand is also available in the old bed of the Damodar which is about 1,000 ft. broad and several miles long and contains sand deposits with an average thickness of about 30 feet. The following extract from the evidence given by Sir Cyril Fox before that Committee is of interest in this connection and also in relation to the question of replacement of the sand withdrawn :—

> "It is my definite opinion, after a careful study of the whole subject and knowing all the available relevent statistics, that the fixed deposit of sand in the Damodar, Barakar and Adjai Rivers is more than sufficient by many times to supply the quantity of sand that may, at the present rate of production, be required even for wholesale sand stowing in one year. I am also definitely of opinion that, whatever amount of sand may be extracted from the fixed deposit at any place in one year, would be replaced during the monsoon floods by the sand which is carried down along the beds of these rivers. If it was found in the course of years that what might be called the current account was not actually proving sufficient to replenish the fixed deposit each year, and that there was any danger of the fixed deposits being depleted to a dangerous extent, it would be quite possible, in the case of the Jharia section of the Damodar River, to increase the replacement from the current account to more than making up any such difference."

Recent borings undertaken by certain private companies over a 21 mile stretch of the Damodar in the Jharia field disclose sand deposits of over 140,000,000 tons ; and the area of sand supply in the Damodar extends for more than 21 miles. Drilling is also proposed to be done by the Stowing Board and the Geological Survey of India in the Damodar and Adjai Rivers

in the Raniganj field. On the whole, the available evidence points clearly to the existence of adequate sand deposits in the three rivers. But the position has been complicated by the plans for the construction of dams across the Damodar for flood control and irrigation and much genuine concern has been felt about the prospect of sand replacement in the future. We, therefore, went into this question with officers of the Central Technical Power Board and reproduce below a note of the discussions :—

" Arising out of the Damodar Valley Project, two questions were agitating the coal industry :

(*i*) the possibility that the construction of dams across the Barakar and Damodar rivers may flood certain coal deposits, and

(*ii*) the effect of the dams on the replacement of sand in the rivers.

As regards (*i*), Mr. Voorduin stated that in selecting the sites for the dams extreme care was being taken to ensure that no flooding of coal deposits would take place. The Tilaiya dam will not have any such effect, nor will the Maithon one adversely affect coal areas. The originally planned Sonalpur dam has been abandoned since, in view of the practical certainty that it will flood out large deposits of coal and make the winning of coal therefrom impossible. A new site for a dam in substitution of this is being surveyed at Panchet Hill on the Damodar to the east of the confluence of the Damodar and Barakar rivers. The survey is in a very preliminary stage but from the knowledge now available it could be said that a dam at the Panchet Hill site will not flood any coal deposits.

" As regards the replacement of sand supplies, Mr. Voorduin pointed out that the sand that has been coming down the rivers is really eroded soil from the upper reaches. In the general interests of the country, every attempt to arrest erosion must be made but even so considerable quantities of sand will inevitably be washed down. In his opinion, the sand that would come down the rivers, even in the best of circumstances, would be colossal and should more than meet the needs of stowing. There was, of course, the effect of the dams to be considered on sand replacement in the coalfields area. As to this, he would point firstly to the enormous existing deposits in both the Jharia and Raniganj areas ; apart from the beds of flowing rivers, there are large deposits of sand in old river beds and the existence of this and should not be ignored. It is true that after the construction of the dams there would be a reduced influx of sand at the lower reaches. But all the dams are being constructed with deep level sluice gates which would flush out sand periodically. Actually such discharge of sand is essential from the point of view of the Damodar Valley Authority which could not afford to have the dam-heads silted up. There is, therefore, no question that these sluice gates would have to be specially constructed. In addition to the sluice gates, some dredging of the channel above a dam might be desirable and the sand dredged out would be dumped on the banks and would be available for sand stowing purposes.

" Mr. Voorduin's considered opinion was that sand requirements for stowing will not be endangered and indeed an undertaking had already been given that the winning of sand for stowing purposes will not be made more expensive than at present."

It would, therefore, appear that the position as regards replacement of sand disclosed above and confirmed in the oral evidence is satisfactory. But the future of a vital industry is dependent on the continued availability of

sand for stowing and we would emphasise the need for utmost caution in further plans for dam-construction on the Damodar. It is essential, too, that the coal industry should be consulted at all stages, for much valuable help and advice will be gained thereby.

The above summary of our discussion also disposes of fears about the possible flooding of coal-bearing areas resulting from the construction of dams across the Damodar.

36. The Coal Mining Committee, 1937, considered at length the question of transporting sand from the rivers to the collieries and recommended the installation of aerial rope-ways as the most suitable arrangement. We cannot improve on this suggestion and will only add that, with stowing on the scale we envisage, it may not be possible to deliver sand at pithead to all collieries, though this should, of course, be the aim, as far as possible. If central sand dumping becomes necessary in certain areas, further transport to pithead should be arranged for by the collieries themselves and the cost reimbursed in the manner proposed earlier.

An estimate of the probable cost of installing ropeways, pumping stations etc., is rendered difficult by various factors. We are very much in the dark about the alignment of ropeways, as this can only be determined by a detailed technical survey. Again, the cost of plant and equipment is still unstable as is inevitable in present circumstances, and estimates given now may not be applicable two years hence. But, nonetheless, we examined this question in consultation with certain ropeway firms and ascertained that the capital cost of installing scrapers and aerial ropeways *at present* for dealing with about 40 million tons of sand in the Jharia and Raniganj fields would be about Rs. 7·36 crores. Additional expenditure will, however, have to be incurred on the installation of new electric transmission lines, new power stations and transformers etc. and on land acquisition. The estimates appear rather high and it is obviously necessary to examine the entire question in detail once approximate ideas of lay-out have been formulated. We are informed that a considerable portion of the equipment will be manufactured in India, the principal importations being wire ropes, electrical gear and technical knowledge. We strongly advise an investigation into the possibilities of manufacture within the country of wire ropes particularly, in view of the large expenditure on wire ropes for stowing purposes and also because of the increasing demand from mining industries for haulage ropes etc.

For obvious reasons, all the plant to be installed must be owned by Government or the Government organisation entrusted with the administration of sand stowing and other arrangements. This raises the question of existing private ropeway installations and the extent to which they may be allowed to continue. The owners would naturally prefer to remain undisturbed, though they would, it is stated, expect to be reimbursed the interest on their capital outlay. We are dubious about the wisdom of leaving existing installations to operate in isolation ; in some cases, they may interfere with proposed new ropeways and, again, operating for restricted private needs, their full capacity may not always be utilised. There may be other considerations also and, on the whole, we think that existing installations should be taken over and operated as part of a co-ordinated all-embracing network of ropeways covering the coalfields. But where, on merits, acquisition is not called for, we would have no objection to the continuance of privately owned and operated ropeway or other systems, if the owners so desire. In that event no case can, in our opinion, be made out for reimbursement of interest on capital outlay.

37. A related question is the ownership of sand rights. So far as we are aware, there is at present no difficulty over obtaining permission to take sand for stowing purposes, and we are reluctant to suggest any change in a system which is evidently working well. We realise that there is a considerable difference between the amount of sand that is and that will be required, and that the situation may change as the demand for sand increases; but we see no need to anticipate this change, and we recommend therefore that there should be no general interference with sand rights but that the Stowing Authority should be given the power to acquire them, in the event of its ever experiencing any difficulty over obtaining sand on reasonable terms. Such acquisition should, we think, be outright, in view of the long-term nature of sand stowing arrangements, on a suitable compensation.

38. With the mention of two further points we shall close our consideration of stowing. We have dealt, so far, principally with the requirements of the Bengal and Bihar fields, but stowing will also be necessary in parts of the Central Provinces and Central India fields and in Talcher. Stowing has been in progress in the Wardha Valley collieries for many years and necessary arrangements are already being made in Talcher. It is desirable to make a comprehensive study of requirements in the Central Provinces and Central India; we know that in the Wardha Valley, at least sand supply is unlikely to present serious difficulties.

39. The adoption of pneumatic stowing in India on a large scale has been strenuously urged before us by one witness. But we have failed to find other support for this sytem. Many qualified witnesses consider that hydraulic sand stowing is more suited to our conditions and that it is considerably cheaper in the bargain. Mention has also been made of possible dangers attending pneumatic stowing. On the whole, we prefer to consider that hydraulic stowing is the principal answer to our problem.

Rotation of Working.

40. "The necessity for control over rotation of working is established" according to the Coal Mining Committee, 1937, "by the fact that in one part of the Raniganj field, the Koithi Seam, which is of Grade I quality in at least an 8-foot section, has in several collieries been destroyed or damaged by the depillaring below it of the Poniati Seam which is of Selected Grade throughout". Control must, in the words of the Committee, involve prevention when justified. In the light, however, of our proposals for securing the conservation by stowing of all coals with an ash content of up to 30%, the importance of rotation of working diminishes. It needs, in our opinion, to be controlled only with the limited objective of preventing the depillaring of a seam with an ash-content in excess of 30% underlying a seam of preservable quality, until the upper seam has been completely extracted. We believe that, in practice, such instances will probably be rare but we see no harm in framing a suitable regulation to cover the point.

Coal Under Railways And Roads.

41. The Report of the Coal Mining Committee, 1937, contains much valuable discussion on the question of extracting the coal locked up under railway lines and sidings. Over 137 million tons of coal are reported to be lying under the Bengal Nagpur Railway and East Indian Railway systems. Though, legally, royalty receivers and mine-owners in the Permanently

Settled areas are entitled to compensation for the coal required to be left for surface support, the railways had sought to escape the responsibility by the terms of their Assisted Sidings agreements which, amongst other things, compel mine-owners to waive all claims for compensation to themselves and to be liable for compensation, if any, payable to others. These were unsatisfactory arrangements and the Committee thought that action on the following lines might be considered :

(*i*) diversion of the railway lines,

(*ii*) estimating the minimum requirements for vertical and lateral support and determining the methods by which the remaining coal should be extracted ; and

(*iii*) compensation (either by the railways or from a cess) to the mine-owners for the coal left for support.

These measures, the Committee recognised, would be palliatives only and were not calculated to enable the extraction by the ordinary methods of working of more than 35% of the coal locked up. If maximum extraction is desirable, stowing should be enforced in all cases. On the question as to whether the railways should pay for, or contribute towards the cost of compulsory stowing, the Committee felt that the best form in which the Railways could contribute would be collecting any stowing cess levied free of commission.

The terms of the Assisted Sidings agreement, in their reference to the extraction of coal locked up under the railways, have undergone some change, but not a material one, since the last Committee reported. The relevant provisions of the old and new agreements are reproduced below :—

Old Terms :—

" Surface rights only will be acquired. An applicant, if also the owner of mining rights in the land so acquired, or in land under the branch or other lines with which the siding is connected, will be allowed to work and get minerals under the said land, provided that all operations connected therewith are carried out in such a manner as not thereby to injure or to endanger the safety of the Undertaking or any part thereof. The procedure laid down in the Land Acquisition Mines Act XVIII of 1885 shall be strictly adhered to in regard to all proposed working of mines under such land. The applicant shall waive all claims for compensation either from Government or the Railway, for any restricted working of the mines that compliance with the foregoing may entail, and shall accept entire responsibility for any accidents that may occur owing to failure to attend to these requirements. The Applicant agrees by the acceptance of these terms to permit any person appointed by the Railway to enter and inspect and where considered necessary make plans and surveys of all workings beneath, or in the near vicinity of, the land acquired for the siding in order to see whether the precautions being taken are sufficient, and the Railway reserves to itself the absolute right to refuse to allow the use of is stock on any siding to which it is not satisfied that proper support has been given."

New Terms :—

" (*a*) The Applicant undertakes and agrees that he will not workor get or permit to be worked or gotten any mines or minerals or other substances in or under the area of land coloured pink on the plan No...hereto annexed (in which land or in part whereof the Applicant now is entitled to the mining rights as the owner or lessee or otherwise) in any manner likely to injure or endanger the safety of (*i*) the siding or (*ii*) the existing railway line or lines within such area which is/are respectively shown on the said Plan No..... by a black line/black lines.

" Particulars of the aforesaid land in which the Applicant is at the date hereof the owner or lessee of or otherwise entitled to the mining rights are contained in the Schedule hereto.

" (*b*) The Applicant will at all times permit any person appointed by the Railway Administration to enter upon, inspect and make plans and surveys of all mines and workings in or under and adjacent to any such land as aforesaid and connect such surveys to the pits shafts and inclines thereof and if the Railway Administration shall consider that the method of working any mines or minerals or other substances is likely to injure or endanger the siding or any existing line or lines referred to in sub clause (*a*) of this Clause, the Railway Administration may apply to the Chief Inspector of Mines to inspect such mines or workings and the Chief Inspector of Mines may, either of his own motion under the powers conferred on him by any enactment regulation or rules for the time being in force or on such application of the Railway Administration as aforesaid, inspect or cause the same to be inspected by any person nominated or appointed by him for such purpose and may either prohibit the working of such mines or minerals or other substances entirely or permit the working thereof subject to such restrictions as the Chief Inspector of Mines may consider necessary or expedient for the due protection of the Siding or such existing line or lines as aforesaid and in such case the Applicant shall forthwith either cease entirely to work the said mines or minerals or other substances or conform to the restrictions imposed by the Chief Inspector of Mines for such working and in either case, the applicant shall have no claim whatsoever against the Railway Administration in respect of such prohibition or restriction.

" (*c*) In the event of the working of any mines or minerals or other substances in or under—

(*i*) any land forming part of the siding, or

(*ii*) any land underlying any existing line or lines referred to in subclause (*a*) of this clause, or

(*iii*) any land on either side of the siding or on either side of the said existing line or lines which may be required for the lateral support of the siding or of such line or lines, being prohibited or restricted under the provisions of the Land Acquisition (Mines)Act, 1885 or any other Act for the time being in force the Applicant hereby waives all claims to compensation which he might otherwise be entitled to make

by reason of such prohibition or restriction and the Applicant undertakes and agrees to be liable for and to pay all such compensation as may be payable consequent upon such prohibition or restriction to any other person in respect of mines or minerals or other substances in or under any land forming part of the siding and in or under any land on either side thereof in which such prohibition ro restriction may be required for the purpose of lateral support to the Siding and to keep the Railway Administration indemnified from and against the payment of any compensation money in such circumstances and against all suits, proceedings, loss, damage, costs (between attorney and client), expenses, claims and demands in relation thereto."

The old grievances still continue and we agree with the Coal Mining Committee, 1937, that stowing is the only solution to this vexed question. Little progress has, however, been made in the past because of the restricted scope of assisted stowing. It is important that this coal should be extracted and we think that our proposals regarding stowing will adequately cover this point.

Government did not accept the suggestion that the railways should collect the stowing cess free of commission, but it was tentatively proposed that when the Statutory Authority (proposed by the Coal Mining Committee) was in a position to supply the sand and the owner wished to work the coal, the railways should pay the cost of getting the sand stowed. Apparently this idea could not be pursued when it was decided that stowing as a measure of conservation need not be adopted. But the equitable claims of mine-owners for compensation for the coal left in support still clamour for satisfaction and we think it would be a fair arrangement if, in such cases, the railways are made to bear one-fourth of the total cost of stowing, subject to a maximum of Re. 0-10-8 per ton of coal extracted. This would mean that the full cost of stowing (subject to a maximum of Rs. 2-10-8 per ton of coal) is reimbursed to the owner, the other three-fourth being paid out of the proceeds of the stowing cess.

42. Dealing with the coal lying under the Grand Trunk Road estimated at about 33 million tons by the Chief Inspector of Mines, the Coal Mining Committee, 1937, pointed out that the Bengal Government had directed the Chief Inspector of Mines not to allow any coal-mining operations within a horizontal distance of 25 feet from a point vertically below any point on the surface boundary of the road. According to this (and because the Grand Trunk Road averages 150 feet in width), all coal would have to be left unworked over a 200 ft. width, of which 50 ft. belong to the mine-owners on either side of the road. The local Government's attitude was described as being evidently opposed to any general policy o conserving good quality coal and the Committee recommended that Government should lease this coal and permit it to be recovered even without stowing so long as the Chief Inspector of Mines thought that extraction will not prejudice the safety of the road. The Government of India decided to leave the matter in the hands of the Bengal Government, who had laid a claim to the coal. The question of title is apparently still open, but it is understood that permission to work the coal is now being granted conditionally on the deposit of the appropriate royalty with Government pending decision on the ownership of the coal. We have no recommendtion to make in the matter save to emphasise the need for granting all reasonable facilities for working this coal.

Effect of Proposals On Coal Requirements.

43. Before we conclude we may briefly refer to the effect of the proposals in this chapter on coal requirements. We have stated earlier that the effects will be qualitative rather than quantitative. Firstly, then, there will be an eventual limitation on the consumption of coal suitable for metallurgical purposes. The requirements of good quality coking coal would be about 4 million tons annually and a further 2 million tons per annum would be made available by increasing resort to blending and cleaning. The present consumption of coals in these three categories may be in the neighbourhood of 12 million tons per annum but we do not envisage that the whole of this quantity will require to be replaced by non-coking coals. Replacement will be necessary of that portion only of the good coking coal and washable coal as goes to other than the iron and steel works and coke ovens, for we have not proposed any restrictions on the use of coals suitable for blending of which large reserves exist and the significance of which in relation to the iron and steel industry is comparatively limited. Replacement, when it does become possible, may be of the order of 4 million tons, the bulk of it by good non-coking coal, principally to meet the requirements of the railways. The consumption of such coal will, therefore, increase to the extent stated.

Conclusions And Recommendations.

(1) As our reserves of good coking coal are limited, it is necessary to pursue vigorously a study of blending and washing possibilities.

(2) But even with full resort to blending and washing it is unlikely that the resources available for the use of essential consumers of good coking coal will last more than 120 years at the present rate of exploitation. **The use of good coking coal should therefore be restricted. It should be supplied only to iron and steel works and coke ovens, and its use by the railways and other industries and for bunkers and export should be prohibited.**

(3) Restrictions on use and production cannot, however, be imposed untill the output of other coals has been raised sufficiently to replace good coking coal. We do not think that this will be possible till about 1954, but **meanwhile the use of good coking coal for bunkers and exports should be prohibited.** The position should be watched carefully so as to enforce restrictions on output as soon as possible.

(4) When restriction on the output of good coking coal is imposed, it should be by way of quotas.

(5) To facilitate the task of restricting output, **a study should be made quickly of the collieries producing good coking coal and coal which may prove suitable for washing.**

(6) The regulation of the use of coking coal could best be secured by a system of licensing.

(7) We do not think that there is any case for the conservation in use of good non-coking coals for the present, but the question must be examined again when the chemical and physical survey of our coal resources has been completed.

(8) The Coal Mines Safety (Stowing) Act has been of limited value in view of its restricted scope. It is now necessary to extend stowing for conservation also.

(9) **Conservation from the mining point of view should aim at maximum extraction in respect of all coals with an ash content of up to 30%. For this purpose stowing should be made compulsory, with certain exceptions.** Since arrangement for stowing on the wide scale envisaged will take time, stowing for conservation should be enforced in certain cases as soon as possible.

(10) **Stowing should be assisted to the extent of 75 % of the total cost, subject to a maximum assistance of Rs. 2 per ton of coal extracted.**

(11) **For meeting the expenditure a cess should be levied at the rate of Rs. 1-2-0 per ton of coal and Rs. 1-10-0 per ton of hard coke. But for the next 5 years the cess should be at the rate of 8 annas per ton of coal and 12 annas per ton of hard coke.**

(12) **We recommend that soft coke should be exempted from the stowing cess.**

(13) **In the construction of dams on the Damodar the importance of the continued availability of sand for stowing should be borne in mind.**

(14) We do not see any present need for Government acquiring sand rights, **but the power to do so, in the event of difficulties arising, should be taken.**

(15) The importance of rotation of working, which was emphasised, by the Coal Mining Committee, 1 37, has diminished.

(16) Attention should be given to the extraction with stowing of coal locked up under railways and the cost of stowing operations should be borne by the railways to a certain extent.

CHAPTER VIII.

THE PLANNED UTILISATION OF COAL.

The General Case For Planning.

The compelling needs of reconstruction and rehabilitation have focussed increasing thought lately on planning as the *sine qua non* for success. In relation to coal, we need to direct our attention to the requirements of a situation attended, amongst other things, with much wasteful use. We have referred to the consumption of good coking coal in a prodigal manner against a background of limited resources. Others have questioned the wisdom of the unrestrained burning of good coal for purposes which could adequately be served by inferior varieties. In all cases, it is urged, we should strive to suit the consumer to his needs and no more. There is, of course, the counter argument that a consumer should be free to take the best he can afford and as much of it as he likes. He can and ought to be trusted to know what, in all his circumstances, he needs and interference would be unjustifiable.

We think the right course to steer is the middle one between these two extremes. The utilisation of coal is not a simple matter of determining what is scientifically needed for a particular purpose ; other factors must be considered such as, for example, the wisdom of transporting inferior high-ash coals over long distances by rail, and others which we shall come to presently. Equally, the advocates of complete freedom of action fail to appreciate the fact that coal is not just an ordinary merchandise. It has other essential uses which must be adequately protected. Good coking coal is almost indispensable to the metallurgical industry and superior high volatile coals are a rich source of valuable bye-products. A country's welfare is prejudiced to the extent that the unfettered use of such coals by others for ordinary fuel purposes endangers supplies to the metallurgical or the chemical industry ; and, as we have stated in relation to good coking coal, an irresistible case arises for restraining would-be consumers. Again, is it necessry that the best coal should be burnt in brick-kilns ? The owner may perhaps think it more profitable, from his limited point of view, to do so, and may even be able to command supplies. But few persons would be disposed to question the accusation that here is a flagrant case of misuse ; and few there are now, we think, who do not believe that the burning of good coking coal for steam raising at collieries or in locomotives is wasteful and inefficient use. The question is not merely one of conserving irreplaceable reserves ; it is the wider one of a continual striving for efficient exploitation which, in this context, means the effective utilisation of the heat properties of coal in relation to the value of the industrial or other effort. It is from these considerations that our recommendations about the replacement of steam power by electricity in locomotives and in the coalfields have emanated. Our conclusion, therefore, is that a measure of control over the use of coal is essential, but that it should be tempered with other than purely scientific considerations of fuel practice. To the extent that enlightened consumers will suit their consumption to actual needs will control be superfluous, but others must be compelled in certain circumstances.

2. For this view, we have found a large measure of support in the evidence recorded before us. Consumers, in particular, have strongly favoured a regulation of the use of coal with the object of ensuring that essential requirements of superior coals are met. Such a regulation, it is argued, will also provide for the consumer the certainty that he is getting the class of coal demanded by him and best suited for his purpose. This will, of course, only acquire its full value when there has been a detailed chemical and physical analysis of coals and a determination of the fuel requirements of various consumers. Some witnesses would even go further and suggest that, in the establishment of industries in future, attention should be paid to, and some control exercised over, the class of coal and the type of boilers or power plants to be installed, so as to eliminate, as far as possible, the consumption of high grade coal. As a corollary, the possibility of using other than the best coals should be explored even as regards existing power plants.

We have thus to consider three fundamental issues connected with the regulation of use—

(1) the physical and chemical analysis of coal,

(2) a determination of fuel requirements for various types of consumers, and

(3) control over the despatch and use of coal so as to relate one to the other.

The Need For A Physical And Chemical Analysis Of Our Coal Resources.

3. We have already stressed the importance of undertaking a detailed survey of Indian coals and we shall revert to this subject in a subsequent chapter. Whether there is to be an enforced regulation of use or not, a chemical and physical analysis is essential for finding out the nature of our resources and for assisting consumers. There is an overwhelming mass of opinion in favour of the analysis and grading of coal for internal purposes. From the consumers' point of view, universal grading provides comparative rough standards of quality. There is some difference of opinion as to whether such grading should be compulsory or optional, but the majority of the witnesses and, in particular, consumer interests, would like to see grading made obligatory. In any case, if a detailed chemical and physcical survey is to be undertaken, we see no objection to the classification of coal seams according to quality and to the publicising of the result for the information and benefit of the general public. The objections to compulsory grading, where these have been stated at all, have not, in our opinion, any substance and we think that grading should be compulsory. This would not necessarily entail any expenditure on the collieries for, in our view, a survey of Indian coals is necessary for more than one reason of national importance and it shou'd, therefore, be undertaken primarily at Government expense. To the question of the technical requirements of such a survey, we shall turn in a later chapter. Two points may, however, be mentioned here. There has been much criticism of the present basis of grading for export purposes. It is alleged that the results of analysis are expressed in unsound terms which convey to the consumer little knowledge of the real fuel value of the coal. Be this as it may, we think that the present basis has proved useful as a rough and ready guide to the calorific values of certain Indian coals, but we agree that grading or classification should, in future, be based upon the detailed

chemical and physical survey the results of which should be stated in internationally accepted terms. Secondly, our attention has been drawn to a defect in the Coal Grading Board Act in that the Act confers no powers on the Board to reclassify a seam on their own initiative, once it has been graded; the initiative for regrading can only come from the owner. We would, however, point out that all seams have been regraded, comparatively recently, under the Colliery Control Order, 1944, and that so far as the internal market is concerned, the country is at present working to the classifications under this Order. The Coal Grading Board's classification, with its accompanying system of certificates for cargoes of coal, still functions in respect of shipment coal, but this is only a small part of the coal trade at present, and we think, therefore, that there is no need to alter the Act since we hope that, within 5 years or so, a new grading or classification will come into force based on a detailed chemical and physical survey of all seams.

Study Of Fuel Requirements Of Consumers.

4. A study of the fuel needs of industry is most essential whether we propose to control the utilisation of coal or not. There is general recognition of this fact and progressive consumers have been devoting increasing attention to a study of their exact fuel requirements. Many witnesses have urged the desirability of so regulating the use of coal that specified industries are allotted the qualities of coal determined on the basis of scientific needs. In other countries, most of the coal produced is bought on specifications; but the great majority of consumers in India have not yet reached that stage of enlightenment. If the country wants quick results, it will be fatal to leave the study of fuel needs entirely to private initiative; the responsibility is one which, in the present circumstances at any rate, should be shared by Government. The study should not aim merely to ascertain what class of coal is best suited for a particular purpose; it must seek to determine also how much is required, where waste is occurring or is likely to occur and how it should be dealt with or prevented. In this way, the study of fuel requirements will repay itself many times over in the economy and efficiency of consumption that will follow.

Control Over Despatches.

5. On the completion of the proposed analysis of coals, it has to be considered whether measures should be introduced for ensuring that the coal demanded by a consumer is correctly despatched. That this is desirable for export coal was recognised long ago by the introduction of a system of certificates for individual cargoes. In the internal market, too, there has been much dissatisfaction over the unreliability of supplies; not infrequently, inferior coal, it is alleged, has been despatched under the name of Selected Grade. There is consquently a widespread demand for a system which will ensure that the consumer gets what he has purchased. There are, of course, some consumers who are well-equipped to undertake detailed analysis of their receipts of coal and so do not need to insist on a check at the despatching end. Further, certification is not obligatory even for export coal and some consider that a pre-despatch inspection is much less called for in respect of coal for internal use. We believe that the answer to this problem must depend on the extent to which the use of coal is regulated. If no control is necessary, there is obviously little justification for a check on despatches; it would be for the consumer himself to arrange for adequate safeguards, a

is done now. But if control is necessary on any appreciable scale, it will probably be found necessary to provide machinery for ensuring that the control is effcetive ; we are, however, referring not to the *ad hoc* control that now exists but to the more scientific one that may come eventually.

Factors Influencing Regulation Of Use.

6. We thus come to a consideration of the extent to which the regulation of use is deemed necessary. We have mentioned certain factors that must be taken into account and shall now deal with them in detail. Briefly, they are as follows :—

(*i*) the requirements of the service to be performed and the extent to which present practices depart from the standards;

(*ii*) the need for conserving good quality coal ;

(*iii*) transport ; and

(*iv*) the cost of fuel to the consumer.

These considerations should influence a decision on the extent to which the regulation of the use of coal is desirable and feasible. In the light of the limited knowledge now available, it is, of course, not possible to scrutinise the coal consumption of all consumers from the angles mentioned. Nor does this seem necessary immediatley, as the bulk of the coal despatched goes to a few principal consumers and the regulation of use by them, where deemed necessary, would produce results of not inconsiderable magnitude. We have already dealt with the coal requirements of the iron and steel works and for bunkers and exports and shall here devote some attention to the consumption of the railways, cotton textile mills, cement works, electricity companies, brick-kilns and for soft coke manufacture. The present consumption of these is probably in the region of 16 million tons per annum. We have commented elsewhere on the consumption of coking coal by the rail ways and other consumers, and we have proposed that they should, as soon as possible, be prevented from using good coking coal. The next point for consideration is whether the present consumption of other qualities of coal by these industries is appropriate and how the good coking coal now used can or should be replaced.

Railway Coal Requirements.

7. Dealing first with railway consumption, we understand from the North Western Railway that their coal should conform, as far as possible, to the following specifications :

(*a*) high volatile coal of over 6,800 calories with ash content up to 11% and moisture under 6 % ;

(*b*) low volatile coal of over 7,000 calories with ash content not exceeding 13 % ;

(*c*) low volatile coal of over 6,500 calories with ash content not exceeding 15 % ; and

(*d*) low volatile coal of over 6,000 calories with ash content not exceeding 18 %.

The first two correspond to the Selected Grade of the Grading Board's classification and the third and fourth to Grade I and Grade II of the Board's classification of the low volatile series. The quantities of each variety required are stated to be as follows :—

(*a*) above 10 per cent of the total

(*b*) above 30 per cent of the total

(*c*) above 50 per cent of the total

(*d*) above 10 per cent of the total

The above seem generally to be the qualities and proportions of coal demanded by the railways operating in Northern India. We have drawn attention earlier to the different evidence of the Great Indian Peninsular and the Madras and Southern Mahratta Railways in this matter. The Great Indian Peninsular and the Madras and Southern Mahratta Railways have been receiving and are content to receive the bulk of their requirements from the Talcher, Central Provinces, Central India and Singareni fields ; the South Indian Railway attach importance to Bengal and Bihar coals, apparently because of the relatively smaller number of standard type engines on the system. Because of their important bearing on the question under consideration, we summarise below some of the salient points mentioned in the evidence of the 3 railways ;

Great Indian Peninsular Railway : The coal received during 1945-46 was as follows :—

Bengal/Bihar coal—		
Selected A & B	234,844	Tons
Grade I	171,894	,,
Grade II, IIIA & IIIB	131,616	,,
Central India coal	148,253	,,
Pench Valley coal	626,396	,,
Ghanda Valley coal	98,702	,,
	1,411,705	,,

For the future, and on the basis of existing and proposed mail and passenger services, the railway would like to receive about 240,000 tons per annum of Bengal/Bihar Selected A and B coal, though this need not necessarily be coking coal and could be high volatile coal of low ash content—up to a maximum of 14% and high calorific value. Chirimiri coal is satisfactory in a large number of cases and could probably replace Bengal/Bihar Selected Grade coal to some extent. For goods services, Central Provinces coal of middling quality would be quite suitable.

Madras & Southern Mahratta Railway : The coal received in 1944-45 was as follows :—

Talcher coal	223,786	Tons
Kothagudium	191,413	,,
Pench Valley	10,210	,,
Bengal/Bihar coal (Selected grade)	241,025	,,
Tandur coal	742	,,
	667,176	,,

The consumption on certain services in the same year was as follows :—

	Mail & Passenger (Tons)	Goods (Tons)
Talcher coal	108,242	81,597
Bengal/Bihar	70,555	101,261
Kothagudium	27,469	100,862
Pench	1,131	9,932
Others	128	474
	207,525	294,126

In previous years, the consumption of Talcher, Bengal and Singareni/ Kothagudium coals was as follows :—

	Mail & Passenger (Tons)	Goods (Tons)
1938-39		
Talcher	139,192	120,010
Bengal/Bihar	...	1,839
Singareni/Kothagudium	68,500	119,344
1941-42		
Talcher	168,429	117,926
Bengal/Bihar	22,403	1,913
Singareni/Kothagudium	15,802	159,092
1943-44		
Talcher	133,716	84,833
Bengal/Bihar	47,780	54,008
Kothagudium/Chirimiri	30,778	160,790

Except in the latest two years, the consumption of Bengal/Bihar coal for mail and passenger services has been comparatively small and is certainly overshadowed by the use of Talcher and Singareni coals. The railway would like to get coal with ash content of up to 10% and calorific value of 10,000 B. T. Us. ! We are, however, informed that during the last 20 years they never had coal with such low ash content.

South Indian Railway : The coal receipts for certain years are as follows :—

	Bengal/Bihar coal	Talcher coal	Deccan coal (Singareni, etc.)
1938-39	300,024	6,160	28,894
1940-41	274,036	2,201	12,888
1943-44	149,108	...	107,894
1944-45	190,456	...	96,695
1945-46	245,665	...	28,687

Up to 1936 -37 the railway used only the best grade of Bengal/Bihar coal, but in subsequent years Grades I & II of Bengal/Bihar coal, to some extent, and the ungraded coals of Central India, the Central Provinces, Talcher and Singareni, have been utilised. It is said that due to the heavy gradients on the railway, only the high grade steam coals of Bengal/Bihar give satis-

factory service. Grade I coal can be used also, though the consumption (on mail and passenger trains) increases by 7% to 10% and more frequent stops for fire cleaning become necessary and reduce average speeds. For goods trains, too, Selected Grade coal is the best; of Grade I approximately 15% more coal is needed. Though standard types of locomotives built since 1926 have been provided with large grates and are suitable for burning coal of higher ash content, the railway have not many such locomotives, especially on the metre gauge system.

Chirimiri coal is found suitable for express and light passenger services but the consumption is 15% to 20% higher. Central Provinces and Bengal/Bihar Grade II coals are definitely unsuitable for all these purposes, though limited quantities can be consumed for pumps, ballast trains, shunting engines and other departmental purposes. Generally the criteria should be ash content not exceeding 17% and calorific value of 7,300 to 7,500 calories. Considering all things, the Railway believe that their optimum coal requirements are :

Selected Grade A & B (for fast mail and passenger services and important goods trains).	42% of the total.
Grade I	42% of the total
Grade II	16% of the total.

N.B.—The Grades shown are those fixed under the Colliery Control Order.

8. These railways are agreed that coking coal is not essential and that the qualities of importance are low ash content and high calorific value. There is some difference of opinion, however, on the question of the ash content of the coal required for mail and fast passenger services. While the Madras and Southern Mahratta Railway place this figure at 10 per cent., the South Indian Railway are prepared to take coal with an ash content of up to 17 per cent. For the railways ash content is important from the point of view of clinker formation. As against this, however, we have been advised that low ash coal is not necessarily better in respect of clinker formation than high ash coal. The percentage of ash—in other words, the quality of the coal as indicated by ash content— has nothing directly to do with clinker formation, for it is sometimes found that the ash of very low ash coal obtained by washing has a lower fusibility than that of the original coal itself. It is possible, therefore, that a coal considered to be of a better quality judged by ash content would present greater clinkering problems. In any case, the fitting of rocking grates to engines has helped the problem of clinkers to a considerable extent and we would like to see this device made more general, primarily with the object of enabling the railways to burn coal with higher ash content.

Having regard to all the evidence produced before us, including that of the Railway Board, we are of opinion that, for fast passenger and mail services, the railways' need of coal of high calorific value is indisputable. To the extent that such coal may be comparativley low in ash content, we accept the implications of this statement. Whether the coal should come from the Bengal/Bihar fields or from other sources in Central India, Central Provinces, Singareni and Talcher is primarily a question of transport. Equally, for the slow goods services, a high volatile coal of inferior type corresponding to Grade II of the classification under the Colliery Control Order would, in our opinion, seem to be sufficient.

We understand that it is not impossible to design locomotive boilers to burn any coal of inferior quality, *e.g.*, Grade II. Engine replacements are apparently now contemplated on a large scale and we trust that, in designing the boilers and grates of the locomotives to be orderd, the Railway Board will take into account the need for avoiding the burning of superior coal for goods engines in particular. The following table gives the total coal consumption of the Class I railways and the consumption on goods services for the last ten years :

	Total consumption of Class I Railways	Consumption on goodss services
1935-36	6,383,407	2,547,743
1936-37	6,588,596	2,700,877
1937-38	7,004,136	3,008,352
1938-39	7,292,378	3,138,576
1939-40	7,481,775	3,331,499
1940-41	7,781,359	3,540,903
1941-42	8,470,193	4,055,414
1942-43	8,272,976	4,185,477
1943-44	8,619,318	4,274,921
1944-45	8,903,362	4,281,960

The consumption on goods services is between 40 to 50 per cent., but the consumption of Selected A & B Grade and comparable (ungraded) coals is probably in the region of 45 per cent and of grade I coal about 20% ; there is a *prima facie* case for economy of coal consumption on goods services from the point of view of quality. As regards existing engines, there is little that can be done to enable inferior coals to be used save the fitting of rocking grates whenever posssible, and this we have recommended.

We shall conclude this subject by saying that if there is any opposition to our proposal to prohibit the use of good coking coal by the railways, the matter should be further considered after obtaining an authoritative opinion from the makers of locomotives, presumably in England and in Amercia, regarding the classes of coal for which these engines are designed and also the classes that *can* be used.

Coal Requirements Of Other Consumers.

9. Not much is known about the precise requirements of the cotton textile mills, the cement works and the electricity companies. The quality of the coal needed is normally dependent on the boiler design, in particular on the type of grate. But there is fairly conclusive evidence pointing to the fact that for the cotton textile mills and electric supply companies in Western and Southern India, the Selected Grade coals of Bengal and Bihar are not essential. The Ahmedabad Millowners' Association have stated as much and the Ahmedabad Electric Supply Company would also be quite content with certain Central Provinces and Central India coals. The Sholapur mills get the bulk of their coal from Singareni and so does the Madras Electric Supply Company. What is possible in these areas should be no less possible elsewhere We realise that certain adaptations of boilers may become necessary and this movement should be encouraged. The best Bengal steam coal is certainly superior to the best Central Provinces, Central India

and Singareni coals, and to the extent that the consumers are satisfied with the lower grades should, in our opinion, the supply of the best coals from Bengal be restricted. As regards cement works, Punjab and Baluchistan coals are being used to a certain extent in the Punjab. We are aware too of collieries being worked in Rewa State by a cement company for its own use; the coal in this case is certainly not of very high quality. About $\frac{2}{3}$ of the consumption of coal in cement works is in a pulverised form in rotary kilns. These installations, we are informed, are designed to use low ash and high calorific value coals. But we are aware also that cement works attach considerable importance to the price factor and that this consideration has influenced increasing use of cheaper or inferior coals available from nearer sources. On the whole, we see no reason for believing that cement companies cannot work with reasonable efficiency on medium grade coal with certain adaptations of plant.

We have already stated that it is not necessary to burn superior coals in brick kilns and we think that the object should be to supply their requirements from the inferior grades corresponding to Grade IIIB of the classification under the Colliery Control Order. Inferior grades of coal corresponding to class IIIA would seem to be adequate for soft coke manufacture and we think that consumption should be regulated accordingly.

Proposals For Regulation Of Use.

10. The general consideration in the matter of the regulation of use is that any large quality discrepancy in fuel requirements and fuel consumption should be set right. Our present knowledge of fuel requirements is restricted and so, on the whole, is the knowledge of fuel consumption. A fuller answer to the question of regulating use can only be provided after the technical study of fuel requirements has been completed. But, meantime, for the reasons urged, and in the light of war-time experience gained as a result of the control over distribution, we think there is justification for—

(*a*) replacing the good coking coal now being used by the railways by good non-coking coal,

(*b*) making the railways use an inferior grade of coal for their goods services in particular,

(*c*) studying the possibility of designing future locomotive boilers to burn high ash coals,

(*d*) restricting cotton textile mills and electric supply companies in Western and Southern India to supplies from adjacent fields and confining supplies from Bengal/Bihar to comparable high volatile coals,

(*e*) confining the supplies to cement works to those corrresponding approximately to Grade II of the Colliery Control Order classification, and

(*f*) restricting the consumption for brick burning and for soft coke manfacture to the inferior coals corresponding approximately to Grade IIIA and IIIB respectively.

We consider this limited regulation possible on the basis of the present knowledge of the qualities of Indian coals. Simultaneously, we think that in future boiler design, the desirability of burning the minimum possible quantity of superior coal should be kept in view. Government are now exercising a considerable measure of control over industrial development and we do not think it would be difficult or unreasonable to regulate future coal consumption in the manner proposed.

The Bearing Of Transport On The Regulation Of Use.

11. The conservation factor has been dealt with by us in the previous paragraph in so far as we have aimed to restrict the use of superior coals. But it is probably clear, too, that we have not proceeded primarily on the consideration that superior coals need to be preserved. The factors that have influenced us are :

(*i*) transport economy, to the extent that the avoidable long-distance haul of Bengal/Bihar coals is avoided ; and

(*ii*) the need for ensuring that certain essential requirements of superior coals are met.

But transport can have another bearing also on this question, for it might be considered undesirable to send inferior coal over a long distance even though the consumer can make do with the quality. The movement of high ash coal is wasteful of transport and it is urged that the most economical use of railway capacity is secured when long distance haulage of inferior high ash coals is avoided and requirements at a distance are met from superior coals. If railway facilities are adequate and ample to cope with all anticipated movements of coal, it is immaterial what quality of coal is moved ; the point arises only in the context of inadequate railway facilities. Further, it will appear later that we favour a zoning of supplies which should lead to an over-all economy of transport. The only exception we think justifiable is in respect of a consumer such as a railway remotely situated whose requirements of coal may be very large and in whose case a very considerable loss of transport capacity may arise in moving high ash coals.

The Price Of Coal And The Regulation Of Use.

12. The price factor is connected with the question of the regulation of use in so far as inferior coals may be relatively more costly than superior coals for a given effort and may thereby raise the cost of the final product to the general public. The criticism is valid but the answer is not necessarily to supply a coal obviously not needed for a specified purpose, but to attempt to bring about an equality of cost by such an adjustment, as may be deemed necessary, of the cost of the coal or the freight on it or both. We shall have occasion to say more on this question later.

Enforcement Of The Regulation Of Use.

13. We have stated that, though other factors come in, the primary one in deciding whether a regulation of use is necessary or not is the extent to which the present fuel consumption departs from precise fuel needs. This, in our opinion, is considerable in the case of the railways and, we have, therefore, proposed that their consumption should be regulated. We think, too, that complete freedom of choice for certain other consumers, such as cotton textile mills and electricity companies in Western and Southern India, may react adversely on the transport position by boosting the demand for the best Bengal coals ; here again, therefore, a measure of control over use is necessary. In certain other cases, such as cement works and brick kilns, there is the evidence of practice in the recent past, and we feel that undesirable consequences will follow complete freedom of choice.

How is this regulation to be achieved ? If Government adopt our above suggestions regarding railway coal supplies regulation for the railways will present little difficulty. As regards other consumers, too, no serious problems will arise so long as the present control over distribution lasts ; and it

is unlikely that control can be lifted for some time yet. But regulation of use on an appreciable scale can be achieved effectively only through a control of despatches by licensing and inspection or by controlled marketing. We should not be understood to mean that a licensing of use will eventually be found necessary. The decision must rest on the further studies we have proposed ; and if voluntary adaptations to precise fuel requirements become common, State regulation of day to day consumption would be unnecessary.

14. We do not think that our limited proposal in regard to utilisation will have any appreciable unsettling effect on the coal trade. What we have suggested probably conforms in a large measure to the practice of the last few years of coal shortage, the end of which is not yet in sight. It may be that a somewhat larger quantity of the medium and inferior grades of coal will be consumed than if there had been unregulated use. But to the extent that our proposals interfere with freedom of action, we think there will be compensation in the better use of our coal resources.

Conclusions And Recommendations.

(1) **A measure of control over the use of coal is essential,** but factors other than scientific utilisation should influence our policy.

(2) The essential pre-requisites to an orderly regulation of use are a chemical and physical analys is of coal seams and study of the coal requirements of various classes of consumers. **On the former should be based a compulsory grading of all coal seams.**

(3) When all seams have been analysed and graded, the need for a pre-despatch inspection of coal would depend on the extent to which use is regulated.

(4) **The Railways certainly require good non-coking coal for their mail and express services but can use Grade II coals for goods services. There is need for studying the possibility of designing future locomotive boilers to burn high ash coals.**

(5) **Even before all coal seams have been analysed and graded and the need for complete regulation determined, the consumption of cotton textile mills, electricity companies, cement works, brick kilns and for soft coke manufactures can and should be regulated on the basis of war-time experience.**

(6) Save in the present context of inadequate railway facilities and with some exceptions, we do not accept the view that long distance haulage of high ash coals should be avoided.

(7) **If certain consumers are compelled to use inferior coals, it would be necessary to consider whether they should receive any concessions as regards the price of coal or railway freight or both.**

CHAPTER IX

ESTIMATED FUTURE REQUIREMENTS—THE SUMMING UP

In Chapter IV, we estimated that, on the basis of available data, coal consumption from 1956 is likely to be in the region of 41 million tons per annum. We then discussed various factors which are likely to vary the requirements and these and their effects may briefly be recapitulated :—

(*i*) The use of electricity in the coalfields in place of steam power may result in a net saving of 1 million tons of coal per annum.

(*ii*) The extension of electricity elsewhere would displace coal as a source of industrial power to an extent that would release about ¾ million tons of coal.

(*iii*) The increasing use of oil may displace nearly 1 million tons of coal by 1956.

(*iv*) The partial regulation of the use of coal, with a slight accent on the use of inferior grades, must undoubtedly increase the actual consumption ; the extent of the increase cannot be easily estimated but may be about 1 million tons per annum.

The effects of the other factors mentioned have already been taken into consideration in making an estimate of future requirements. The net result, therefore, would be to reduce the actual coal requirements from 1956 to about 39 million tons.

The Coal Commissioner's office estimated immediate consumption to be about 32 million tons per annum, if existing manufacturing capacity is to be fully utilised. This figure is probably a slight over-estimate as would have appeared from the figures we gave of the increase in coal consumption in future years. The gross demand for coal after another 10 years is likely to increase by 11 to 12 million tons per annum and the present requirements, if industry were working to full capacity, would thus be of the order of 30 million tons per annum. This estimate finds support from other available data. Earlier, we have shown that the total despatches of coal in 1945 were about 25·73 million tons, and, for our present purpose, despatches can reasonably be taken as having been actually consumed. But it is known also that in 1945 a number of important demands could not be met in full : the iron and steel works got nearly 700,000 tons of coal less than their optimum requirements ; and as against optimum requirements, there was also a short-fall in supplies to almost all other consumers who were rationed on the basis of the limited quantities of coal available for distribution. If the short supplies are added to the actual consumption, a figure of a total demand approximating closely to 30 million tons will be arrived at.

2. The immediate problem facing the coal industry and the country is to make up as rapidly as possible the short-fall of about 4 million tons per annum between estimated existing demand and actual production, and thereafter to step up production so as to keep pace with a continually growing demand as the plans for industrialisation materialise. It has also to be borne in mind that the carrying capacity of the railways is inadequate to carry all the coal required by the country, and that steps will have to be taken to cope with this problem also, but we refer to this in a later chapter. If despatches could be stepped up at the rate of 1½ million tons per annum from the present level of about 26 million tons, a balancing of supply and estimated demand would probably be achieved by 1954, and thereafter supplies should be adequate for the country's requirements.

We may, however, point out that this increase is super-imposed on to a production figure which includes a large proportion of the good coking coals of the Jharia field, which we should like to see reserved at as early a date as possible for the exclusive use of industries which depend on coking coals ; and on the figures given above, therefore, it appears that the likelihood of reservation of good coking coals may not arise within the next 9 years. Against this, it may be that the demand may not rise to the figure which we have anticipated ; that figure is based on information which we have been given regarding plans for greatly increased industrialisation, and any alteration in these plans may appreciably reduce the figure. If this should prove to be so, and if the increase in production for which we hope can be achieved, there may come a time when production starts to outstrip demand, and in that case a curtailment of the production of good coking coals will become possible earlier.

3. Realising the value of a break-down of coal requirements by regions or zones to the planning of production and transport facilities, we tried to obtain a picture of where the 39 million tons of coal will be needed in the future. The starting point was obviously the present Province-wise distribution of coal, but in ascertaining this, we have come up against the difficulty of incomplete statistics. We have, therefore, had to confine our examination of this question to the Province-wise despatches of coal in respect of which more detailed information is readily available. These despatches were made on account of the Railways, Bunkers and Exports, Iron and Steel Works, Textile Mills, Cement Works, Paper Mills, Sugar Mills, Jute Mills, Tea Gardens, Coke ovens and small Provincial requirements which, in 1945, got about 20·2 million tons of coal out of the 25·73 million tons despatched. The distribution of 19·36 million tons to these consumers we compute to be as follows ; small quantities despatched to other areas have been ignored.

Bengal	4·52 million tons
Bombay	2·89 „
Madras	1·28 „
Assam	1·08 „
U. P.	1·97 „
Bihar	3·25 „
C. P. & Orissa	2·28 „
Punjab & N.-W.F.P.	1·60
Sind	0·49
Total	19·36

By 1956, the requirements of these consumers are likely to go up to about 28 million tons, on the assumption that the effects of electrification and substitution by oil will be more or less counterbalanced by a reduction in the quality of the coal consumed. In the absence of fuller knowledge of the future location of industry, it is difficult to say with exactitude at present in what region the increased demands will rise. But this is known to some extent in respect of cement works and cotton textile mills : and on the basis of the iron and steel Panel's recommendation, a reasonable guess can also be made in regard to iron and steel works. In the Provinces which we have

named earlier, anticipated requirements are likely to increase to the following extent on account of the additional demand from these three industries only:

Bengal	955,000	tons
Bombay	73,000	,,
Madras (including States)	321,000	,,
Assam	26,000	,,
U.P.	192,000	,,
Bihar	375,000	,,
C.P. & Orissa	1,446,000	,,
Punjab & N.-W.F.P.	386,000	,,
Sind	107,000	,,
Total	3,881,000	,,

For the rest, we can only give broad indications. From what we have stated earlier, it should be clear that electrical development will be most intense in the Bengal/Bihar area with large thermal stations supplementing hydro-electric power. The increased coal consumption on this account is likely to be off-set to a certain extent by the fall in the coal requirements of the railways, if our proposal to electrify apart of the track is implemented. A good proportion of future industrial requirements is likely to arise in the Damodar Valley tract, synchronising with the development of hydro-electric and thermal power that is contemplated. The Central Provinces too have considerable potentialities of industrial development. The increase in the domestic consumption of coal will, to start with at any rate, be in Bengal, the United Provinces, Bihar, the Central Provinces and the Punjab. On the whole, the increase in consumption will generally be in areas within easy distance of the principal coal resources. This is as it should be in a scheme of rational and co-ordinated development.

Conclusions And Recommendations.

(1) Making allowance for all the factors influencing requirements, approximately 39 million tons of coal are likely to be needed from 1956.

(2) The present gap between supply and requirements is about 4 million tons.

(3) **We suggest that the aim should be to step up supplies at the rate of 1½ million tons per annum.** In that case a balancing of supply and demand would probably be achieved by 1954.

(4) It does not appear that a restriction on the use of coking coal can be imposed for another 9 years, unless production should outstrip demand earlier.

PART II

CHAPTER X

PLANNING FOR PRODUCTION

The Case For Planning.

Except perhaps in the United States of America, it seems now to be axiomatic that commercial and industrial development can only be achieved through co-ordinated planning. During the progress of the recent war many countries began to formulate plans of development, and, in particular, industrially backward nations like India and China. For countries like ours, so backward in industrial development and knowledge, yet possessed of many of the physical resources for development, the real issue is not whether planning is desirable or otherwise, but whether it is possible to frame a plan for our needs after defining what those needs are, and how that plan should be put through, and by whom.

2. The concept of economic planning involves three major assumptions:

(*a*) The free inter-play of supply and demand can no longer be expected to yield uniformly the results we have in view. Therefore, control or regulation of the so-called free enterprise system has become necessary.

(*b*) Under a "free" economy, only such regulations are tolerated as are so general in character and in their effect that their impact on individual groups of producers and consumers cannot be perceived. The area of common agreement will be so small that the economic life of the country will be left literally and truly free and untramelled. On the other hand, there is such agreement as regards basic human needs that if a free economy cannot supply them, a planned effort on a large scale must necessarily be assayed.

(*c*) There should be no economic obstacles to planning.

In the following paragraphs, we shall deal with these assumptions briefly in relation to the coal mining industry in India.

3. (*a*) The history of the coal industry in India in the past three decades has been notorious for violent fluctuations—fluctuations which do not even possess the character of being cyclical. We have discussed at some length in a previous chapter the course of production and prices in the past. These do not give an encouraging picture of what may happen in future under a system of unregulated production, particularly when it is known that our requirements of coal are likely for some years to exceed production. There are certain peculiarities of the coal industry in India which appear to justify a different approach and a more specific consideration. It is a widely held belief that in the Indian mines, by and large, wasteful methods have prevailed. Another factor to be borne in mind is the peculiarity of the consumption strata in this country. Almost one-third of the output of coal is taken every year by the railways; and large coal properties are held by consumer interests such as the railways and the steel and cement industries.

(*b*) Undoubtedly the one dominant feature of the post-war world economy is the stress laid on a minimum standard of subsistence for all humanity. Every country aspires to be able to provide for its inhabitants a sufficiency of the needs of existence, including food, clothing and shelter. There is a

consensus of opinion on the need for framing the future world economy in such a fashion that larger provision can be made for satisfying these basic human needs But industrial economy, in the stress of free competition, cannot always afford to follow the dictates of a plan which deliberately aims at social results. In this connection, an extract from one of the general reports to the Third World Power Conference held at Washington in 1936 is relevant : " One of the most striking features of the report submitted to this Conference is the clear cut evidence that unrestricted competition .... has been generally abandoned so far as the coal industry is concerned. Nearly all countries apparently have found that an unregulated system of production brought results that were socially undesirable ". Apart from this social factor, we feel that it is doubtful whether the free interplay of supply and demand can produce the desired output of coal without some assurance, possibly from the State, as regards prices and consumption. If such an assurance is needed, we see no reason why State activity should not also extend to planning and directing the future programme of production.

(c) We have carefully considered the possible difficulties, technical or otherwise, which may impede the implementation of a plan in the matter of production. We do not think there are any hurdles which cannot be overcome by careful and co-ordinated planning. It is true that planning restricts free private enterprise in certain ways, but this is only incidental. It may be that there is no inherent incompatibility between freedom of enterprise and what may be called the public determination of economic priorities. Theoretically, it may be possible to work out a compromise, but in the coal industry, and particularly in India's coal industry, we feel that it is not possible to reconcile obvious incompatibles.

4. Planning for production as an isolated problem is fairly simple, but in respect of coal, with its peculiar traits and its inelastic character, the implications of a plan, any plan, are far reaching. When produced, coal has to be got away and it cannot be produced fast enough unless you take it away from the pits equally fast. When despatched, it has to reach the consumer in sufficiently uniform regularity to be of efficient use, and yet to enable use in an efficient manner despatches must be carefully classified. To make it attractive for both the producer and the consumer, an assurance of stable prices is necessary ; and for stability in price and regularity in production, a plan is an essential pre-requisite. The case for planning, therefore, rests not only on the vagaries of the past history of the coal industry in India, but also on the complexity of the operations needed to fulfil a desired programme. We doubt whether, left to itself, private enrterprise can produce the requisite quantity of coal or sustain production for any length of time without directed effort or certain assurances from the State. During years of low prices there was considerable overproduction of coal and " slaughter " exploitation of the better seams. The industry failed to agree on any voluntary scheme designed to introduce order into the chaotic arena in which cut-throat competition, quick profits, and personal interests prevailed over the long-term interests of the industry. It seems obvious, therefore, that a programme for production must be planned carefully and implemented by measures which the State alone is in a position to enforce.

Programme For Production

5. We have indicated in the preceding chapters the detailed future requirements of the country, estimated by assessing the reflection on demand of the industrialisation programme. We have dealt with the need for sounder methods of mining. We have also pleaded for the conservation and scientific

utilisation of limited coal resources. From our survey emerges the fact that provided the country's planned programme of industrialisation matures, about 39 million tons of coal will be needed annually from 1956. Allowing for colliery uses, this calls for a production of about 42 million tons annually.

At present, the demand for coal is almost certainly in exess of available supplies by about 4 million tons a year. The gap in production that has to be made up by 1956 is very considerable. But we realise that it is impossible to step up coal production suddenly and, taking a ten year view, we have, therefore, suggested that the aim should be to secure a progressive increase in the supply of coal at the rate of 1½ million tons a year from now on. An important factor which should be borne in mind is the effect of our proposals regarding conservation generally and the restriction of the use of good coking coal in particular. There is today a considerable production of good coking coal, nearly ⅔ of which is utillsed for other than approved purposes. It is not suggested that immediate curtailment of the production of good coking coal from its present output figure of about 7½ million tons a year to the present essential consumption should be enforced. Substitute coal must be produced first to replace the good coking coal now being used and the process of replacement will take some years. We should also bear in mind the possible effects of our long-term proposals for the more scientific utilisation of the different classes of coal. The details of our production plan may need revision to the extent such utilisation becomes possible. Subject to these comments, we would place before the country a production target of approximately 42 million tons of coal to be reached by 1956.

6. Preparing a plan and a programme is one thing. But its execution in the midst of the many complexities of the coal industry, as it exists today in India, is not an easy task. The primary object of a plan is to help produce a certain quantity of coal. In framing proposals for implementing the programme, we must, therefore, start from the units of production. We have given elsewhere details about the number and sizes of the mines in India. A careful survey of the industry starting from the units of production reveals many factors which must be considered before a particular programme of production and development can be put through. These factors are briefly enumerated below but detailed consideration is reserved for later chapters.

The Structure Of The Industry.

Historical reasons are responsible for the emergence of the Managing Agency system in India. Although we have made no attempt to collect accurate statistics, it is probably correct to say that approximately two-third of the coal industry today, excluding the large group of consumer-owned collieries, is run by Managing Agents, if looked at from the production angle. Some of the remaining mines are in the hands of individuals who operate them as family concerns. There are others operated through managers or contractors in which the owners are usually financiers. The form and shape of the producing units under the various influences, either of Managing Agents or of financial houses, are factors which must be taken into consideration in the implementation of any plan of production.

Mining Leases

The form of leases granted to the actual operators of coal mines is obviously of great importance. Leases may ordinarily be said to contain provisions which fall under two broad categories. Firstly, there is the personal element which relates to rates of royalty, surface rent, if any, initial salami and subsequent salami payments for depillaring and payment for way-leaves.

The second category relates to methods of mining and specific provisions for various operations, such as principles of first working, regulation of depillaring, section working, stowing, instroke and outstroke working, rotation of working, etc. The size of the area leased out for working, and the boundaries of the area, are of considerable importance. In considering the various types of leases at present in force, we have to consider, too, the supervision provided by the original owners or the principal lessors over faithful observance by the operators of the terms of the leases.

Fragmentation And Irregular Boundaries.

It is an unfortunate feature of land ownership in certain parts of the country that practically no restrictions exist on the transfer or sub-division of ownership and/or possession. The Coal Mining Committee, 1937, expressed the opinion that " the economics of production are definitely in favour of comparatively large mining units ". In some of the coalfields in India the devolution of mining rights has led to much the same harmful effects as sub-infeudation in land. Small areas with irregular boundaries are at present dotted all over the Jharia and the Raniganj coalfields. The number of small mines operating shows no tendency to diminish. Limited financial resources and lack of technical supervision, which often characterise small mines, may become obstacles to systematic mining.

Ownership Of The Mineral.

In parts of Bengal and Bihar, which occupy a dominant position in the matter of coal production, the Permanent Settlement has invested mineral ownership in the Zamindars. To a considerable extent, the zamindars have signed away the right to exploit minerals in their property under semi-permanent leases extending up to 999 years. The original lessees have in their turn granted sub-leases which have further been sub-leased even five or six times over. In the rest of British India and in the Indian States, mineral rights belong to the State. The various grades of intermediaries between the zamindar and the mine-owner have, by and large, shown little interest in the proper development of the resources they have leased out for exploitation. It is debatable whether general legislation can effectively provide for the proper drafting of individual leases, but admittedly a proper designing of leasee and enforcement of sound working methods are of great importance in the matter of development. Their importance increases with the need for working to a higher production target in the coming years.

Labour, Mechanisation And The Contractor System.

Output in an industry like coal is very largely dependent on the productivity of the miner. We need to consider the peculiar features of mining areas in India where almost no attempt has so far been made to develop a settled and contented mining community. The accidental proximity of the principal coalfilds to areas inhabited by aboriginal tribes provided labour recruiters with an ample supply of poor and illiterate people, willing and docile but hardly capable of sustained and hard work. Coal-mining is principally done by such people and any programme of production must take note of the labour conditions in the various coal producing areas.

Consideration must also be given in this context to the contractor system prevalent in many parts of India. We are told that the advantage of the system is usually a regular supply of miners but there are certain serious defects.

Though the use of machines in mining is familiar in India, progress in mechanisation has been slow. Latterly, owing to war conditions, machines have not been available and many orders are still outstanding. Mechanisation has progressed very considerably in other countries. In war-time, the United States mine operators, by an intensive use of machinery, increased the output of coal, already very high, by as much as 50% as compared with the pre-war production. If our production plan envisages the opening up of new fields, consideration will obviously have to be given to the more extensive use of machinery. Mechanisation must, of course, be considered in the light of the general problem of unemployment in various parts of India

Captive Collieries.

By "captive collieries" we mean mines belonging to consumer interests. The various railway companies in India, before Government took over the management of the railways, had acquired a number of collieries principally as an insurance against the lack or shortage of supplies of coal from the market. These railway-owned collieries today form a large group capable of producing a substantial quantity of coal. The industry has complained over several years of the misuse by the Railway Administration of the power deriving from this ownership in determining the price which the railways pay for their coal purchases from the market. On the other hand, considered as a form of insurance, these collieries have proved to be of help in enabling the railways to continue their services, when the market has failed to make deliveries according to contract. The iron and steel companies and certain shipping interests have followed the practice of the railways in acquiring certain important coal-bearing lands. The cement companies too are following this practice. These captive collieries present an issue which must have a very great influence on any programme of production which the industry may have to adopt.

Finance, Prices, Wages and Profit.

Small units of production usually lack the finance required for the proper development of a colliery, and we have heard of cases in which the financing of the day-to-day operations of small collieries is done by middlemen, who in turn contract to take the entire output at favourable rates. We must also note the short-sightedness usually displayed by many joint stock concerns in the matter of providing reserves for the future. In the coal-mining industry, there is need for ample funds for the development of future workings, for the usual replacement reserves and, as coal mines are a wasting asset, for amortization reserves. Further, if coal production is to be increased, new properties must be developed, and large investment funds, which may be locked up without any return over a period, will be necessary. Whether any assistance from the Government is necessary in this connection is an issue which must be considered. In our opinion, finance in the broad sense is a major consideration in the production programme.

Almost unanimous evidence has been tendered before us regarding the need for stabilising coal prices. It has been urged that the very low prices in the past have really been responsible for the various defects and handicaps from which the industry has suffered, and we think that the emphasis placed on the stability of coal prices is not overdone. But it should be clearly understood that stabililty does not mean fixity. Stability achieved, whether by agreement or by regulation, must have capacity for adjustment, for only then can it be of value to any plan for increased production. It must not

also be forgotten that wages are closely interlinked with prices, even in a free market. But when prices come to be regulated by an authority outside the industry, it becomes an unquestioned obligation on that authority to regulate wages also. Another integral part of prices is the profits of the operators and the owners. These have an important place under free enterprise and even in a partially regulated economy, they exercise a considerable influence.

The Development Of New Fields.

Of necessity, when our target of production is continually increasing, new fields will need to be opended up. The potentialities of each field, judged by the time it will take for development and the classes of coal available therein, must be considered, alongside the possibility of increasing transport facilities. Certain increases can, no doubt, be expected from existing fields. The provision not only of better transport facilities, where these are defective, but of electrical energy for more intensive production requires attention. All production projects need to be related to our resources of various classes of coal and of the areas which are likely to require those particular classes. The problem appears to be one of zoning in respect of both supply and transport ; and it will be necessary to chart a course of new development.

State Ownership And Management.

It has been a curious but common feature of the issue of nationalisation that State ownership and management are considered as the very last resort when every other means of attaining certain objectives is held to be a failure. We do not propose to approach the problem from this angle. We would like to postulate certain concrete objectives in the matter of the production and distribution of coal. These objectives are related to the time factor, and if it is found that they can best be attained by a particular device, there should be no hesitation in recommending such a course. The projection of State operation into the field of industry is nothing new, and if we are convinced that this method is not only the surest but also the quickest, we will not hesitate to recommend it.

We are aware of the prolonged discussions over the question of nationalisation of the coal industry in Great Britain culminating in the recent Nationalisation Act. It has been argued that private enterprise can deliver the goods provided an adequate return on the capital invested is ensured. But it is also possible to argue that if private enterprise is given protection in certain matters, it should become subject to some form of State control ; in short, if private enterprise has ceased to be " enterprise ", it should cease to be " private." In the light of our programme for production, we shall analyse the various factors which would contribute to the fulfilment of the programme and the various remedies necessary to remove obstacles to such fulfilment. We shall consider also, in the event of State ownership or management being considered a useful device, whether the basic requirements of efficient management of the industry can be provided. The main objective of reaching a target for production should, in all cases, remain the principal objective.

Conclusions And Recommendations.

(1) The increase in production that is necessary can only be secured through a well-considered plan in the preparation and implementation of which the State must play a positive role.

(2) Various factors which have a bearing on production must be considered and existing defects removed.

CHAPTR XI

THE STRUCTURE OF THE INDUSTRY.

Structure Forms in The Coal Industry.

The structure of the coal industry in India follows a familiar pattern. The production units or groups generally resemble similar units in other countries though the Managing Agency system, peculiar to the soil of India, has perhaps introduced complications, or may be refinements, in certain directions. For instance, while, in other countries the movement towards integration took different forms and adopted various devices in India this tendency had already been forestalled by the favoured Managing Agency system, which in itself represents an integration between industry and industry. Generally, the trend towards larger individual units of production has not been so prominent in India as in other countries. There was, however, a greater use by Indian entrepreneurs of the Managing Agency system and in this System was concentrated an increasingly closely-held control over the mining industry. These factors contracted, as well as sharpened, the inelasticities of the coal trade.

2. Broadly the coal industry in India can be classified under three main structural forms :—

(a) captive collieries which are owned and operated by consumer interests ; these reveal a pure form of vertical integration ;

(b) collieries under the control of Managing Agents who also finance and operate a number of other industries ; here we find a combination of horizontal and vertical integration which is prevalent over a large portion of the coal industry in India ; and

(c) privately owned collieries which operate in small units and reveal the inherent characteristics of diffused ownership and individualistic enterprise.

Captive Collieries.

3. Captive collieries represent principally the holdings of the railways and the iron and steel companies. The important place they occupy is shown by their share in the total output of coal in British India. In 1942, of the total output of nearly 26 million tons, railway collieries produced about 3 million tons, *i.e.* 11·5%. The collieries owned by the iron and steel companies were responsible for the production of 1·35 million tons, *i.e*, 5·2% of the total output. It should be noted that neither the railway collieries nor those owned by the steel works were working to full capacity. Market considerations were a decisive factor in the past in restricting the output of railway collieries, and the factors of conservation and safety have latterly influenced the iron and steel works in regulating the production of coal in their collieries. In providing for the requirements of coal in the next few years, the large reserve capacity of these collieries should be prominently kept in view. How and to what extent captive collieries can be fitted into the picture of our plan for increased production will be discussed in a later chapter.

Managing Agents.

4. The importance of the place which Managing Agents occupy in the coal industry is well recognised. A large number of such Managing Agents

are British houses of great standing and repute, all of which are members of the Indian Mining Association. The position that the collieries under the management of members of the Indian Mining Association occupy will be evident from the following figures :

Year	Total output of coal in British India	Percentage output of members of the Indian Mining Association
1942	25·96 million tons	65·0%
1943	22·45 million tons	71·0%
1944	23·49 million tons	70·6%

5. Almost all the evidence tendered before us by Chambers of Commerce, representatives of producers and consumers' organisations, colliery owners and others directly interested in the coal industry, has favoured the continuation of the Managing Agency system. We are not surprised at this unanimity, as the Managing Agency system has come to stay in this country, and almost in every industry, more and more use is being made of this device in respect of new ventures. An opposite opinion has, however, been expressed by independent witnesses who have no direct connections with the coal trade and by labour organisations.

6. While we do not propose to analyse at great length the working of the Managing Agency system, it will be useful to summarise the various advantages and disadvantages of the system in so far as the coal industry is concerned.

First and foremost, there are undoubted advantages in the grouping of a number of production units under unified control and management Grouping by itself confers distinct benefits ; for instance, technical staff of greater ability and experience can be employed. This is of great import ance in India where there is a chronic deficiency of technical talent. Again there are a number of common services between coal producing units which can with advantage, be centralised and supplied from a common pool. Services of this nature include surveying, zamindari work, mechanical workshop facilities, provision of hospitals and medical care. The grouping of a number of production units also facilitates the consideration and execution of schemes requiring large capital and which can serve the needs of the entire group. In recent years, the problem of sand-stowing, whether for safety or conservation, has come to the forefront. It has been possible for a number of collieries grouped under one Managing Agent to get together and work a common scheme for the winning and transport of sand to the various collieries. If these collieries were operating on their own, they would not have been able to afford the large outlay of capital needed. Likewise, grouping facilitates joint effort in matters such as the provision of electrical energy.

It has been urged before us that, through the Managing Agency system, large benefits accrue to the collieries by the centralisation in the office of the Managing Agents of the purchase of stores and equipment for the collieries and the sale of their output. On the other hand, " if each individual colliery were to provide and pay for its own purchase and selling organsiations, the costs will be considerably increased and the efficiency and flexibility of the system appreciably reduced ".

The advantages outlined above essentially proceed from the factor of grouping, and it is not essential that a mechanism like the Managing Agents should be super-imposed to achieve these benefits It is suggested, however, that the mechanism is a convenient device through which many other substantial benefits accrue. The most important of them is the financial backing which a Managing Agency provides for the individual collieries under its charge. It is not unknown that, during periods of depression, many a colliery company would have gone under but for the assistance rendered by its Managing Agents, who, with their own funds, kept the collieries going. Moreover, during the early years of a new production unit, it is the Managing Agents' responsibility to nurse the venture into the profit-earning stage. All may not agree with the rather exaggerated claim put forward by the Indian Mining Association that the "Managing Agency system in the coal industry has never shown its value to greater effect than during the last 20 years". It is, however, true that wiser Managing Agents kept quite a number of colliery companies, which might otherwise have gone into liquidation, alive during the depression period.

It is further claimed that Managing Agents furnish business management to the collieries of a most efficient nature. Their experience in conducting the management of a number of varied industries is at the disposal of their colliery group. Such management is not easily or so cheaply available to individual collieries. The claim is also made that Managing Agency houses with a long tradition behind them must, of necessity, adopt a long-term policy in respect of the companies under their control. It is stated that "they have interests bedsides coal to look to and it is unlikely that they will spoil this reputation by sacrificing the colliery companies under their management for the benefit of their other interests". There is perhaps some truth in this statement, but it must be said that a long view in a commercial house may not necessarily be what is best in the national interest.

The concentration of industrial power in the hands of Managing Agents no doubt provides them with the opportunity of adopting a progressive policy in respect of labour conditions. Additional amentities and the provision of education and welfare facillties for the workers can be maintained collectively. Such power, however, is, with some reason, disputed by the workers' representatives, inasmuch as it reduces their powers of collective bargaining on behalf of the workers of individual collieries.

7. Turning to the other side of the picture, the Coal Mining Committee, 1937, considered that the Managing Agency system has not been an unmixed advantage to the coal industry. Their sharp criticism of the role which Managing Agents have played is summed up partly by them as follows:

> "In short, to use a sporting metaphor, the coal trade in India has been rather like a race in which profit has always come in 'first', with safety a poor 'second', sound methods an 'also ran', and national welfare a 'dead horse', entered perhaps, but never likely to start".

The gravamen of the charge against the Managing Agency system lies in the excessive attention which Managing Agents of collieries, infact of any industry are likely to pay to the commercial aspect of the operation of the companies under their control. It has been said that Managing Agents serve as trustees for the shareholders of the respective companies and as such feel in duty bound to earn for the shareholders the best dividends they can. It is further stated that this policy does not prevent the adoption and carrying out of a long-term policy. But it is possible to envisage conflict between the policies of individual collieries and of what is good for the coal industry as a whole.

Managing Agents usually receive their remuneration in the form of a fixed monthly sum for office expenses and a fixed percentage on net profits though in contracts entered into prior to 1936, provisions can be found for payments to the Managing Agents of certain fixed percentages on sales or on output or on a similar basis having direct relation to the net profits of the, company. The Indian Companies Act, as amended in 1936, provides for the limitation of the tenure of Managing Agents to 20 years and also limits the remuneration of the Managing Agents to a percentage on net profits as defined in the Act. By 1956, therefore, all Managing Agents' contracts must adopt the uniform basis of receiving remuneration as prescribed in the Compnies Act. It is notorious, however, that remuneration based on raisings or on sales or on any other basis not directly connected with net profits can be very injurious to the ultimate interests of the company concerned. We will not go as far as the *ex-cathedra* opinion of the Coal Mining Committee, 1937, that in actual practice sound methods of mining and national welfare suffered considerably under the Managing Agency system. We consider that the conclusion does not necessarily follow from the institution of the Managing Agency as such, but where quick commercial profit becomes the criterion in the conduct of an industry, inevitably larger interest recede to the background. Nor do we agree with the view that the methods of remuneration of Managing Agents, which prevailed in the past in the coal industry, placed a premium on high outputs, quick sales and large profits. But the history of the coal industry during the depression period reveals a number of unsound features as for instance, over-production peristing through a period of very low prices. There is also no defensible evidence supporting the case for slaughter exploitation of the better class of seams which took place during this period. For both Managing Agents must take their appropriate share of blame.

Managing Agency houses, with their intersts in various industries, exhibit a concentration of industrial power which may mean supremacy of technical and business management, and progressive policies in respect of labour conditions; but these do not necessarily secure also the ultimate good of all the individual units under their control. Take for instance the operations of a centralised selling organisation. Many Managing Agents of coal companies also control other industrial units which are large consumers of coal. It may not be considered essential that the colliery companies should get the best price for their coal under these conditions. Nor does it follow that the sundry consumer units under one house will receive the best quality of coal at the best possible price. Centralised administration of selling may thus lead to certain inequities for one or the other unit. There is no assurance under the Managing Agency system that the individual colliery companies do effect their sales in the best possible manner. In regard to the centralised purchase of stores and equipment, the individual companies do no doubt get the benefit of low prices for bulk purchases, though it is not known in every case whether the Managing Agents charge for such services. Occasionally the purchases are made by Managing Agents on their own responsibility and at their own risk. If companies under their control need these stores and purchase them from the Managing Agents it is considered only fair that the risks taken by the Managing Agents should be properly paid for. Note may also be taken of the complaint that the fixed monthly allowances, which Managing Agents charge for office expenses, mean a net payment to the Managing Agents, inasmuch as the contracts usually provide that the companis pay for all the

staff engaged on the companies' work, either wholly or partly. If the head office of the Company is located under the same roof as the Managing Agents' offices, it is common practice for the companies to pay for their respective shares of the office rent and other common service facilities made available to them by the Managing Agents. Therefore, it is contended that the fixed monthly sum paid to the Managing Agents is just another name for a net payment to the Managing Agents for which no concrete services are rendered.

It has also been urged that Managing Agents have displayed in the past no special zeal in the matter of furthering the interests of shareholders of individual companies under their control. The pooled industrial power in the hands of the Managing Agents is utilised in a fashion which promotes the larger interests of the Managing Agency house, which may not necessarily coincide with the interests of individual companies. It is true that aggregation of power does in some phase or other exhibit a monopolistic aspect and, therefore, to that extent is an anti-social trend which must be condemned.

In the coal industry, there is a further complication in that a large number of Managing Agency houses are British-owned. To this feature we do not attach much importance, for it is commonly known that the stockholding of most of the coal companies is now in Indian hands ; and if the respective Managing Agents do not fall in line with the wishes of the shareholders, it is in the hands of the latter to make a change. It must be recognised that, broadly speaking, the collieries under the management of such houses are far better run than many units under Indian management. Larger resources and the provision of better technical talent are responsible for such a feature. The progressive policy of these Managing Agents, as a whole, in the provision of amenities and in following more efficient mining practices should be commended.

There is an allegation that in the coal industry some Managing Agents have, through foresight, obtained leases of large coal-bearing areas and have been following a policy of waiting for the market to become " high " before opening up a new coal area. It is stated that the opening up of new fields has in this manner been retarded. There is, however, the reply that development can proceed only *pari passu* with the provision of transport facilities over which the lessees have no control, and further that such development can take place only when the economic conditions of the industry justify it. But the fact remains that large portions of known coalfields areas remain undeveloped. This may be a re-assuring factor in the context of our growing needs for coal and a word of appreciation must be extended to some of these Managing Agency houses, who have carried out extensive prospecting and boring in such undeveloped areas. Their statistics and analyses will form a very useful guide in framing our detailed plans for development.

8. In regard to the large segment of the industry controlled by Managing Agency houses, we feel it will be futile to express a detailed judgement on the benefits or otherwise of the system. The subject in general has been in continuous debate for over 20 years. The amendments to the Indian Companies Act in 1936 provided the culmination of efforts to improve the working of the system. It is not suggested by any one that the limitations imposed by the 1936 Act have in any way detracted from the efficiency of operations of Managing Agents. It may be that further experience has since pointed to certain other glaring abuses which could only be put right by legislation. On the other hand, there is probably a more wide-awake sense

of responsibility amongst the Managing Agents, which would restrain them from utilising their position of advantage for their own personal benefit. The investing public have become conscious of their rights as shareholders in various companies and they have begun to exercise a healthy and useful influence towards securing a proper conduct of their companies by the Managing Agents.

The system of Managing Agents is favoured by industrialists all over the country, large and small. Almost every new venture which has been placed on the market during the last two years is presented under the sponsorship of a house of Managing Agents. We realise that, because of acute deficiencies of managerial talent in India, Managing Agents must continue to be a dominating form of mechanism for industrial schemes. It is, however necessary to investigate in detail the alleged abuses of power by Managing Agency houses and, if it is proved that such abuses exist, to undertake legislation for preventing their continuation. We are not equipped to carry out such an investigation.

Broadly, our view is that Managing Agents have rendered useful service to the industry in the past. We do not ignore the fact that commercial objectives have always been the guide-posts of their policy in respect of coal mining operations. But we appreciate that Managing Agents are not in business for the sake of their health. If their mining policies have sometimes led to avoidable waste and losses of valuable resources, and if they have unwittingly worked against are called national interests, it must be recognised that no one has clearly laid down so far the policy for sound mineral development or defined clearly what these national interests are. We feel that it is the duty of the State to take such measures as would make it clear to every operator of the coal industry what the national interests dictate in regard to mineral development.

Privately Owned Collieries.

9. The third structural form is composed of a large number of privately owned collieries, mostly of small size and often with very diffused ownership. In chapter III we have tabulated the total number of mines in India according to their annual output. On the whole, it would be true to say that in India there has not been any pronounced trend towards the amalgamation of smaller mines to form larger production units, as has happened in Great Britain, U.S.A., and other coal producing countries. In Great Britain, the number of mines in active operation contracted from 3289 in 1913 to 2539 in 1928 and 2080 in 1936 ; at the same time, average yearly production per mine rose from 87 to 90 to 110 thousand tons. In the U.S.A., from 9331 in 1923, the number of bituminous mines fell to 6315 in 1935 and only rose to 6620 in 1943 when the production was over 50% above that in 1935. In India there were 725 coal mines in active operation in 1942. Only 138 of these produced more than 50,000 tons a year. But in 1944, when production from British Indian coal mines fell from the high of 26 millions in 1942 to 23 5 millions in 1944 the number of mines increased to 994 classified as follows :—

287 with output over 30,000 tons a year.

235 with output between 7,200 and 30,000 tons a year.

472 with output up to 7,200 tons a year.

Approximately half the number of active mines were producing less than 600 tons of coal per month, and in all contributed only 4·1% of the total production. Of the 725 mines operating in India in 1942, there were 133 " wagon-mines ", that is mines producing less than 1,000 tons of coal in the year.

10. The privately owned mines exhibit certain structural variations. There are a number of what may be called " family mines " owned and operated by individual families. But in many others, the ownership has passed into the hands of people whose primary interests are in other things than coal. Some owners are pure and simple financiers and, in some cases, utilise the services of raising contractors for operating the mines. There are others who are principally merchants in coal and who, with their distribution organisations, consider it profitable to own certain units of production. Recently other traders who supply foodgrains and consumer goods in the coalfields areas have appeared on the scene as owners and operators of small mines.

It must be admitted that the presence of independent small sized units of production is in no way necessarily a weakening factor in the structure of the industry. Some of these mines are operated as efficiently as a larger mine with much greater resources at its command. Small independent collieries may also at times present a healthy check to the grasping proclivities of larger groups. By reason of their independence they have a right to exist, but we cannot shut our eyes to the large number of small units of production, which can, by no stretch of imagination, be expected to have sufficient technical talent at their disposal or adequate financial resources for a long term plan of development. In fact, the picture is more alarming if we look at the sizes of some of these mines and their irregular boundaries. This problem of excessive fragmentation is dealt with in another chapter. Here we merely note the fact and express our belief that, in any orderly plan of development, the continued presence of such small units as cannot, by reason of their structure, adopt sound technical methods of extraction or provide necessary finance is a danger to the stability of the coal industry. We have already referred to the inevitability of economic and social controls in an industry of such fundamental importance as coal. The right of the State to interfere with the socalled personal liberty or rights of small operators cannot be disputed once we appreciate that the situation is charged with danger in respect of both the stability of the industry and the conservation of national resources.

Conclusions and Recommendations.

(1) The Managing Agency system in relation to coal has both advantages and certain defects. On the whole, Managing Agents have rendered useful service in the past. The existence or otherwise of abuses should be a matter for enquiry and legislation, if necessary.

(2) There is some justification for the existence of the small privately owned collieries, but if any of them react adversely on the interests of the country as a whole, remedial action is necessary.

(3) Some of the defects of private ownership and operation of the industry can be removed if the State makes it clear what the national interests dictate in regard to mineral development. This has not been done in the past.

CHAPTER XII

MINING LEASES

In the Permanently Settled areas of Bengal and Bihar, mineral rights have, through the acquiescence of the Government of India, been enjoyed by the zamindars who thus also possess the power to grant mining leases. In the rest of British India, with the exception of a few small and comparatively unimportant regions, and in Indian States, the right to minerals belongs to the Government and to the States respectively. The grant of prospecting licences and of mining leases in British India is regulated by rules framed many years ago. As regards Indian States, the position briefly is that the Rulers, while possessing unfettered discretion, have agreed to the suggestion of the Government of India that, in the case of certain essential minerals which include coal, the grant of prospecting licences and leases to other than the subjects of the State should be governed by the general policy embodied in the Government of India rules. Surprisingly, however, the grant of mining leases in the Permanently Settled areas is subject to no regulation or restriction by the State, with the result that a zamindar is free to grant leases entirely at his pleasure and even to a non-British subject, even though in British India a certificate of approval or a prospecting licence or a mining lease can be granted only to a person who is a British subject or the subject of an Indian State or to a company or firm controlled by British subjects or subjects of Indian States. At least one case has been reported to us in which a mining lease for a mineral other than coal has been granted by a zamindar to a firm virtually controlled by non-British subjects. It is extraordinary that while the Government of India sought to guide the Rulers of Indian States in regard to the grant of mining leases, the zamindar in the Permanently Settled areas is not subject to any guidance, far less control.

Position In The Non-Permanently Settled Areas Of British India.

2. The preliminary steps to the acquisition of a mining lease in British India, outside the Permanently Settled areas, are a certificate of approval and sometimes a prospecting licence. In regard to the latter, it has been laid down by one Provincial Government at least that the applicant must satisfy Government that he is in a position to employ an efficient prospecting agency or is a *bona fide* prospector with special knowledge of geology or mining. For coal, the normal period of a prospecting licence is one year, though extensions for a further total period of 2 years can be granted on proof that search of the land cannot be completed earlier. As regards mining leases, the following important provisions exist.

(*i*) During the currency of a prospecting licence, the Government may grant a mining lease to the licensee in accordance with the terms contained in the rules for the grant of mining leases.

(*ii*) No mining lease shall be granted so as to cause the total area held on lease for minerals of whatsoever kind other than natural petroleum by the lessee or by those jointly in interest with him to exceed 10 square miles within a Province. For coal, the minimum area to be leased or sub-leased should not normally be less than 33 acres and wherever conveniently possible the area should be considerably in excess of this minimum.

(*iii*) No assignment of a mining lease or transfer of any right or interest thereunder will be sanctioned except to a person holding a valid certificate of approval and subject to the same condition as to the maximum area under lease.

(*iv*) Normally, the length of an area held under a mining lease shall not exceed 4 times its breadth. In the case of mining leases for coal, the area leased or sub-leased should generally be rectangular, and its length should not exceed twice its breadth in cases where coal may be expected to underlie the whole of the area of the concession. In the cases in which the seam does not underlie the whole concession, the ratio between the length and the breadth of the concession should be still smaller. These provisions may, however, be relaxed with the previous assent of the Director, Geological Survey of India.

(*v*) The term for which a mining lease may be granted shall not exceed 30 years but the lease may contain a clause permitting renewal for a period not exceeding 30 years, on a dead and surface rent not exceeding twice the original dead rent and surface rent agreed to, the royalty payable being that in force on the day next following the date of determination of the original lease.

(*vi*) The Royalty payable on coal is 5% on the sale value at the pit-mouth with a minimum of 2 annas per ton and on coal dust half these rates.

3. A number of criticisms have been levelled against these provisions. It is stated that little care is taken to ensure that an applicant for a certificate of approval is, in fact, a fit person to undertake eventually prospecting and mining operations, both of which are of a technical nature. By and large, we think this is a valid criticism and we feel too, that more attention is probably paid to the financial position of the applicant than to his ability to undertake technical operations, either by himself or with the assistance of qualified personnel. As regards prospecting licences, the principal complaint made before us was that the maximum period of the licence, *viz.*, 3 years, may frequently prove inadequate to complete prospecting work on a systematic basis. We are inclined to think that this contention is correct in the circumstances which have prevailed hitherto; but a considerable expansion in the staff of the Geological Survey of India has now been sanctioned, and we believe that a further more detailed prospecting of the country's coal deposits is contemplated in the near future. The fuller information thus gathered by the state should make the task of the individual prospector easier. Further, it should be noted that no maximum limit has been placed on the area that can be covered by a prospecting licence, and the result of permitting prospecting to be extended over an unduly long period may be to delay the development of a large area. We do not feel, therefore, that we can recommend any change in the maximum term of a prospecting licence.

As regards mining leases, the main criticism is against the period of a lease. It is argued that, for coal, 30 years is often too short a period to exploit an area, on which much capital must inevitably be expended if mining is to be done efficiently with modern methods. We agree with this criticism and consider that the standard period of a lease should be 60 years and that, if desired, an extension for 30 years more should be granted. The longer period would be conducive to more orderly development and would avoid the wasteful exploitation inseparable, in the best of circumstances, from the natural desire to obtain maximum benefit during the currency of the lease. The existing condition about the variation in the rates of dead and surface rent and royalty would, of course, apply to the extended period.

4. Very little has, however, been stated before us about what we consider to be the most serious defect in the present system for the grant of mining leases. The fitness of an applicant for undertaking or supervising technical operations and the suitability of the area sought to be taken on lease and its lay-out are judged in the main by non-technical executive officers of Government. Coal mining is a highly technical operation in the successful execution of which a great deal must depend on the nature of the area to be worked. Areas are not infrequently selected by applicants without regard to possible geological disturbances or proved faults and dykes, heavy-feeders of water which may necessitate high pumping costs etc. Nor does the mining lease, as now granted, show sufficient recognition of the importance of developing seams of marketable value in a systematic manner. The prime need of laying out a mining area in a predetermined and planned manner is rarely recognised. The result of these defects is that in many cases mining operations are rendered difficult and lead to considerable waste of coal. The objective should be for Government to associate technical advice with the grant of a lease and the development of the mine. Where possible, an undeveloped area should be laid out in a predetermined manner taking into account all relevant technical considerations. In other cases, the suitability of an applicant for a certificate of approval and the suitability of the area selected for a prospecting licence or a mining lease must be judged in consultation with technical experts. Until recently, technical advice was rarely taken by Provincial Governments before granting mining leases; indeed no technical officers were available with Provincial Governments for such consultation. Latterly, the situation has been better understood in some quarters but we would like to see mining engineers appointed in every Province possessing valuable minerals to advise the Government on matters relating to the grant of mining leases. We shall make proposals later for securing co-ordination of action, which is most essential in this matter, if the resources of the country as a whole are to be developed in an orderly and well thought-out manner.

Arising out of the foregoing, we would mention the need for incorporating in a mining lease such special technical conditions as may be deemed necessary in particular cases. We have in mind, for example, the question of suitable barriers and a systematic extraction of seams. Much has been said about the vague and defective nature of the leases given out in Permanently Settled areas, but we think that the charge can, equally validly, be laid against the Government of India and Provincial Governments. This similarity extends also to the enforcement, or rather, in practice, non-enforcement of whatever technical provisions may exist in a lease.

5. Certain other defects too have been noticed by us in the leases, granted by the Provincial Governments. In Bihar a number of leases, albeit in the poor coal-bearing areas, have been granted for as little as 2 years and of from 1 to 5 acres. In the Punjab leases have been granted for 10, 15, 20, 25 and 28 years. We have been unable to compare the location of the various lease sites in Bihar with a view to determining whether the coal-bearing areas could have been leased out in a manner more in accordance with accepted ideas; nor have we been able to confirm that the period of 2 years was a reasonable one for careful development. The odd variety of lease periods in the Punjab needs little comment, save that we think that in the majority of cases there will be indiscriminate or little exploitation. This last leads to another curious feature. In the Punjab the number of new coal-mining leases granted from 1936-42 was 40, but the number of collieries raising coal in 1942 was only 42. For the same years, 37 new leases had been granted in Baluchistan though the total number of collieries producing coal in 1942 was only 23. Many lessees

apparently neglect to develop their lease-holds, and pay the frequently nominal dead rents. With the comparatively limited value of the Punjab and Baluchistan coals, this may not be a matter of serious consequence, buf it undoubtedly points to the need for continuing vigilance on the part of the Provincial Governments for ensuring that the areas leased out are, in fact, properly worked. Such vigilance would be profitable in disclosing also defective mining methods that may have been adopted in particular cases. Government's responsibility ought not to end with the grant of a lease.

The Position In Indian States.

6. The position in regard to the grant of mining leases in the Indian States has been briefly referred to earlier. As the leases mostly follow the British Indian model, most of the unsatisfactory features obtaining in British India will be found to exist. We have referred to the importance of co-ordinated action in the development of the country's coal resources, and co-ordination in this context must necessarily aim at a large measure of uniformity. Some of the Indian States possess valuable coal deposits, including hitherto unexploited areas. Unless, therefore, the States extend their cooperation, the scheme of orderly development will be inevitably retarded. We are sanguine that the need for coordination and uniformity of action will be fully recognised by the Indian States and that, as a first step, they will adopt the suggestions we have made earlier for improving the conditions governing the grant of prospecting licences and mining leases in British India and providing effective technical supervision.

The Position In The Permanently Settled Areas Of Bengal And Bihar.

7. It is when we turn to a consideration of mining leases granted in the Permanently Settled areas that we come across the most serious defects. Mention has already been made of the wholly unfettered discretion of zamindars in this matter. In the early days of coal-mining, more than a hundred years ago, the zamindars, who were generally ignorant of their right to minerals, let out their lands on Mokrari Mourashi Pottahs which, according to the provisions then prevalent, conferred on the lessees all rights to the land from the sky to the centre of the earth. These leases were on a permanent and unchangeable rent basis. Later, when the landlords became aware of their rights, and of the value of the minerals underlying their land, leases of coal-bearing lands were given out with better provisions regarding royalty payments and with terms and conditions requiring, in general terms, maximum exploitation of the available coal resources. These leases, too, being for a period of 999 years, were to all intents permanent and generally covered vast areas. While the pecuniary value of the minerals had been realised, there was, not unnaturally at that time, little appreciation of the value of technical assistance in the grant of mining leases. In the face of the continued failure of the Government of India and of Provincial Governments to take technical considerations into account, one can perhaps condone these early mistakes of the zamindars. One can also, perhaps with greater justification, condemn the refusal or failure, which persists to this day, of Government to remedy the harmful situation that was developing in the Permanently Settled areas. More recently, coal-mining leases given out by the zamindars contain more adequate provisions regarding mining methods, but the practice of leasing out large tracts for 999 years continues. The condition requiring the lessee "to work the mine in proper, skilful and workmanlike manner and according to the most approved practice for the time being adopted in similar mines in the Province and in conformity in all respects with the rules and regulations

in that behalf for the time being in force and promulgated by Goevrnment or other authorities under the Indian Mines Act, 1901, or any re-enactment or modification thereof for the time being in force and so as to raise and obtain the largest output therefrom" is found in recent leases, but short of resort to a court of law, the landlord is unable to ensure that the provisions are carried out in practice. We have been informed that " there is no dearth of instances, in spite of specific provisions in the leases, of landlords or their agents not even being allowed admittance into the mines to look into the state of things prevailing therein". There are a number of other disabilities, too, from which the zamindar claims to suffer and which we shall refer to later.

8. The Coalfields' Committee, 1920, drew attention to some of the defects arising from the private ownership of mineral rights in Permanently Settled areas. It was stated that the landlords who ought normally to be keenly interested in the proper working of their leased properties did not have the technical guidance of mining experts and that the supervision exercised had been confined to the prevention of fraudulent evasion of royalty only. Large areas of coal-bearing lands had been leased more with the object of receiving as much as possible by way of salami than with a view to the economical working of the estate as a whole. The worst offenders in this matter were, however, intermediary lessees who, with the object of obtaining a quick return, had sub-leased portions of their holdings, eventually producing areas of such small dimensions and fantastic shapes that it was quite impossible to work the coal satisfactorily. After consideration of all the issues involved, the Committee came to the conclusion that a controlling authority should be set up by Government with the power, amongst other things, to regulate the leasing of coal-bearing lands so as to prevent such excessive sub-division as would lead to inefficient and wasteful working. Intending lessors of coal-bearing lands of less than 100 bighas would be required to refer the matter to a Coal Conservation Board whose decision would be final.

Dealing with the same problem, the Coal Mining Committee, 1937, observed that the landlords in the Permanently Settled areas had not controlled their leases properly and that it was essential that Government should step in and protect both the landlords and the national interest. For this purpose Government should obtain power to supervise and control the terms of new leases so far as technical matters were concerned, including the size of a lease-hold and the duration of the lease. The Statutory Authority proposed by this Committee would exercise, amongst other functions, control over new leases and over the amalgamation of small properties, adjustment of irregular boundaries, etc.

No action was taken by the Government of India on either of these recommendations and the only relevant comment we have found is on the recommendation of the Coal Mining Committee and is to the effect that the question of control over new leases might be left over until the proposed Statutory Authority came into being. The result has been the continuance of the evils of unrestrained leasing in the Permanently Settled areas. The Panchakote and Burdwan Rajs have furnished to us certain details in respect of leases granted by them in the years 1936 to 1945, and in view of their considerable interest, we reproduce them in Appendix XIV. It is extraordinary that even to this date leases incorporating many of the serious defects to which repeated attention had been drawn over a period of years are being granted. The leases are generally 1 or 999 years and the areas given out are sometimes as small as 15 bighas. We cannot understand the idea underlying these quasi-permanent leases; the zamindar is alienating his interests for a period the developments over which cannot, by any stretch of imagination,

be foreseen. To this extent, too, national interest must be adversely affected and we would like to record our strong condemnation of the practice. Salami against which there has been a considerable outcry, is still recovered, perhaps on an increasing scale, and there is a wide variation in royalty rates. There is evidence, too, of the little attention that is paid to the desirability of laying out leaseholds in an orderly manner, having regard to geological and other technical considerations, though in the reply sent to us by the Bengal Royalty Receivers' Association mention has been made of a scheme prepared by the Association under which "small royalty receivers amongst its members would combine to appoint technical advisers with approved qualifications". Further, it is stated that "some of the large royalty receivers amongst its members have already in their employment technical advisers with proper qualifications and others are shortly going to do so".

The Question Of Salami.

9. As we have stated, much criticism has been levelled against the system of salami as practised by zamindars and lessees. The Coalfields' Committee 1920, in dealing with the suggestion that salami should be abolished, considered that the result might be an immediate demand for higher rent or royalty. Accordingly, the Committee thought that it would be sufficient to provide against the abuse of salami by, for example, prohibiting its levy for allowing the extraction of pillars. The evidence tendered before us on the question of salami is of a conflicting nature. On the one hand, we are told that "a mining lease is not an absolute transfer of the right of the owner but is a transfer of a right to enjoy the property for a certain time or in perpetuity. Salami is a part consideration or price paid to the owner for such transfer. In lieu of the balance price, which would in any case, have been available to the owner if he had transferred his right out and out, it is contracted in the mining lease that the lessees would pay a minimum royalty and a royalty which represents nothing but a deferred payment of the balance consideration money". Supporting this view, the Indian Mining Association have stated that "the abolition of salami would be most strenuously resisted by all parties concerned, as this is a payment generally accepted throughout the mineral industry; if abolished, it would require to be substituted by higher rates of royalty which will be unacceptable to lessor and lessee alike". On the other hand, there is a large volume of opinion which would regulate the levy of salami by fixing standard or maximum rates. In our opinion, salami has been a thoroughly bad thing and has been responsible in the main for the fragmentation that has harmed the Bengal and Bihar coalfields; and we shall revert to this question in the next chapter. Here we shall deal only with the suggestion that salami is, in fact, an advance recovery of a portion of the royalty. From Appendix XIV, it will appear that in 1939 the Panchakote Raj granted a lease for 87 bighas on payment of Rs. 1,754 as salami and six annas per ton as royalty; the salami works out to approximately Rs. 20 per bigha. In 1943, another lease was granted for 565 bighas on payment of Rs. 14,141-14-0 as salami and seven annas per ton as royalty; the salami in this case is about Rs. 25 per bigha, though the royalty is higher. In a lease of 400 bighas granted by the Burdwan Raj in 1937, the salami recovered was Rs. 8,000 or Rs. 20 per bigha. The average salami levied on 2,616 bighas leased out by the same Raj in 1942 is less than Rs. 4 per bigha; the average for 1943 and 1944 is less than Rs. 10 per bigha. The leases in all these cases are for 999 years and one is left wondering as to what portion of the royalty

which would otherwise have been levied, is sought to be capitalised in these comparatively small advance payments. The explanation given on behalf of the Royalty Receivers' Association is no doubt a plausible one but it does not, in our opinion, withstand the test of scrutiny, and we have little hesitation in suggesting that salami is a payment really quite unrelated to royalty. We cannot seriously believe that the abolition of salami can justifiably be made the ground for any appreciable increase in royalty rates which, in any case, we propose should be standardized.

Royalty Rates In The Permanently Settled Areas

10. As in the case of salami, there is a conflict of evidence on the question of standardization of royalty rates. We have already stated that uniformity in mining leases is desirable and this should apply not merely in regard to the grant of mining leases but also to the contents of the lease documents, in so far as it can reasonably be secured. It goes without saying that the grant of mining leases in the Permanently Settled areas should conform to the practice we have advocated for the rest of British India ; whether this objective can be secured in the present circumstances and, if so, how are matters for later consideration. But if the need for uniformity in this matter is recognised, we do not see how the need for similar uniformity in regard to royalty rates can be questioned. In the non-Permanently Settled areas of British India, royalty is generally related to the pitmouth value of the coal, subject to an absolute minimum. In the Permanently Settled areas of Bengal and Bihar, however, the rate is generally a fixed one and there is a wide variety of rates. In Appendix XIV will be found that royalty per ton has been fixed at rates of 1 anna, 1½ annas, 3 annas, 4 annas, 4½ annas, 6 annas, 7 annas and 12 annas ; even in 1942 and 1945 rates as low as 1 anna and 1½ annas have been levied. In the information gathered by us from mine-owners, we have come across the following further extraordinary cases of royalty payments :

Despatches in 1945 (tons)	Royalty paid or payable (Rupees)
5,095	90-0-0
2,775	40-0-0
3,648	4,344-14-0
486,944	13,496-15-6 (to zamindar)
412,398	4,450-0-0
100,381	1,41,327-7-0
27,845	41,779-7-5
17,003	28,425-5-3
29,848	67,157-3-0
892,402	79,625-1-7 (to zamindar)

In two cases, we have shown only the royalty receivable by the zamindar, though further amounts were also due to intermediary parties ; in other cases, the total amounts paid or payable are shown. In this maze of royalty rates, we are forced to the conclusion that zamindars are frittering away their assets in a most indiscriminate manner and that there is no equality or even approach to equality in the incidence of royalty payments on coal producers.

It would appear that this wide variation in royalty rates must tend towards instability in the coal industry since it renders some coal companies more vulnerable to competition than others. We are, therefore, of the opinion that royalty rates in future should be placed on a uniform basis ; there are considerable difficulties in arranging this in the existing order of things, and so we leave further discussion of the matter over to Chapter XIV.

We may, however, add here that it has been urged that the rate of royalty should be related to the value of the coal so that coal of inferior quality incurs a lower royalty than coal of superior quality ; the only way of achieving this in an equitable manner would seem to be on the basis of a percentage of pit-mouth value as laid down in the Mining Rules for British India in the non-Permanently Settled areas.

We are not in a position to make recommendations for a standardization of royalties payable under existing leases. Such an interference with existing contractual rights can, we think, only be considered if the proposals we make in Chapter XIV are accepted by Government ; thereafter, the financial and legal implications involved will require careful study.

11. It is perhaps not necessary to say that we would like to see our proposals as regards salami and royalty rates adopted in the Indian States too; the need is no less in their case.

Instroke And Outstroke Rights.

12. A serious defect in mining leases granted by zamindars has been stated to be the absence of a clause conferring on the lessee the right to work " instroke " and " outstroke ". " The right of instroke is the right of conveying minerals from a demised mine to the surface through a pit or shaft in an adjoining mine ; it is the converse right to that of outstroke which is the right of conveying minerals from an adjoining mine to the surface through a pit or shaft in the demised mine." The legal position is that, when a lease document is silent on this question, there is an inherent right to ' instroke ' working, though, according to the Bengal Royalty Receivers' Association, the right can be restricted by specific clauses in the lease. If the right has been restricted, or when, as in the case of outstroke working, the right is not inherently conferred, the zamindar must be approached for permission to work instroke or outstroke. We are informed by the Indian Mining Association that " in normal cases, if the lessor is amenable and reasonable in his attitude, permission for outstroke working can be obtained for a lump sum payment or for a small royalty per ton. There have, however, been cases in which a lessor for personal or other reasons has refused to grant outstroke rights." Though a landlord cannot, in the absence of specific provision, object to instroke working as such, he may be in a position to raise difficulties. He may have stipulated that a barrier be maintained round a leasehold which would then prevent instroke working. He must then be approached for permission to break the barrier and may impose terms, as he may justifiably feel that the breaking up of the barrier takes away his protection from floods, fire, etc. Further, his coal would be mixed with that of the neighbouring property and railway weighments will no longer be an automatic check on royalties ; this matters considerably when the royalties are at different rates.

As regards outstroke working, though way-leave is usually granted on payment of royalty at the rate of about one anna per ton, there may be groups of landlords, head-lessors and subsidiary lessors involved ; negotiations with all these may become protracted and may lead to the payment, to the different parties interested, of shares aggregating 2 annas per ton or even more.

13. On behalf of the landlords, the justification for the levy of a lump sum or a way leave royalty for instroke and outstroke working has been stated by the Bengal Royalty Receivers' Association as follows :

" A lessee acquires one property from the lessor in the first instance and has in the lease no provision for any instroke and outstroke work (such provision is never kept in a lease when the lessor and the lessee

have not in contemplation of the contiguous property belonging to the same lessor being subsequently acquired by the said lessee). The lessee may on some future date acquire the contiguous property from the lessor and may either get a provision made in the new lease for instroke and outstroke work or may not if he decides to work the other property as a separate mine. If provision for instroke and outstroke work is made in the new lease then no question therefore is raised. If, however, on a later date the lessee decides to work the two properties as one property and desires to get the right of instroke and outstroke then the question of further consideration in the shape of way-leave royalty arises and there is surely justification for same. The lessee is going to save a lot of capital outlay for not being obliged to open a separate mine and is going to pierce the intermediate barriers and benefit in many ways. The charge of way-leave royalty in such cases is no doubt justified. We are placing this case, as against this case a very strong argument can be raised that there is absolutely no justification for the superior landlord in charging way-leave rent in the circumstances where both the properties are held by the same lessee under him. Further, justification thereof will be very apparent if the question is considered from another angle. At the time of making the two leases the lessee never contemplated such instroke and outstroke work and on the contrary he had originally planned to develop them as separate mines. If he had made such contemplation in the beginning and the fact had been made known to the superior landlord no doubt some provisions in regard to that would have been made in the subsequent lease or may be that the superior landlord at the time of making the second lease might have decided on higher salami and higher rate of royalty for the second property, having regard to the fact that the lessee would be saved from any capital outlay on sinking new shafts, etc., and of the development works. The charge of way-leave rent in this case is a substitute for what additional consideration or otherwise the superior landlord would have derived at the time of making the second lease for granting such right.

"There is no lack of example in this coalfield of lessee acquiring and working a contiguous property by instroke and concentrating his entire work in such property to the exclusion of the original property. The lessee thereby deprives the superior landlord of the original property from his royalty income. If he had worked the two properties as separate mines then both the properties would have yielded royalty. If therefore a way-leave rent is charged by the superior landlord of the original property for the conveyance of such 'foreign' minerals through his property— surely his action is justified."

In further support of their contention, the Association have quoted the following extracts from Macswiney on Mines :

"The lessee of a mine is entitled, *prima facie*, to work the minerals by instroke. And he will not be deprived of this right, unless by clear and specific provisions. However, his position may be different, if he is acting with *mala fides*, or unskilfully.

"In some cases where the right of outstroke or of underground carriage is claimed, the position seems clear. When the lessee of a mine is also the lessee of the shaft and the non-mineral strata, but is not the lessee of the surface he is not, whatever his rights with respect to the shaft and the non-mineral strata, entitled *prima facie* to carry foreign minerals from the pit's mouth across the surface. And when he is not

the lessee of the non-mineral strata, but has driven roads therein for the purpose of working the demised mine, he is not entitled, *prima facie*, to use such roads for carrying foreign minerals underground. And the lessee of a mine is not, in that character only, the lessee of the space or vacuum which his workings create, the immediate property in such space or vacuum being in or reverting to the lessor.

"As regards outstroke, however, the lessee of a mine may be also the lessee of the land generally, including therefore the surface, the shaft, and the non-mineral strata. And as regards underground carriage, he may be also the lessee of the non-mineal strata ; and in each of these cases, the question arises, what is his position ? To answer this question, regard must (it is submitted) be had to the position of a lessee as contrasted with that of a freeholder. When a lease is granted for a specified purpose, the lessees cannot, *prima facie*, use the demised property for another purpose. On the other hand, in cases of waste a lessee is not guilty if he uses the property for a purpose for which it was intended to be used. The question therefore (it is submitted) is, was it within the probable contemplation of the parties that the lessee should have the right of outstroke or underground carriage ? The burden would (it is submitted) be upon him to show that it was.

If a lessee carries foreign minerals without having the right to do so, the lessor may obtain compensation by way of way-leave rent."

14. On the other hand the absence of instroke and outstroke rights and difficulties encountered in acquiring them subsequently have, in practice in a number of cases, led either to losses of coal *in situ* or to increased raising costs. The Tata Iron & Steel Company in their written evidence have stated that the following consequences can ensue :—

(*a*) Compulsory duplication of shafts and inclines leading to fragmentation since no rights are included to bring the coal underground from one area to another.

(*b*) Losses of coal areas due to the demarcation of boundary lines inconsistent with geological conditions. This has resulted in coal areas being lost or locked up by faults and dykes and intrusions.

(*c*) Difficulties of negotiating way-leaves in order to centralise production.

That the absence in leases of "instroke" and "outstroke" provisions does lead to loss of coal or increased raising costs seems beyond doubt. But we realise that there is some force in the lessor's contention that the free exercise of instroke rights may lead to confusion in the matter of royalty payments and may on occasions prejudice his interests in other ways, *e.g.*, when the lessee neglects to work the lessor's property. The first objection is not, however, an insuperable obstacle, for methods for calculating royalties by underground measurement and apportionment of despatches can be laid down to apply to all leases. We are not aware that the second objection is based on many occurrences of the sort described but the provision as to minimum royalty would seem to be a sufficient safeguard, as it is in other circumstances also. The other argument advanced, *viz.*, the avoidance of extra expenditure to the lessee by the facility granted, has not, in our opinion, much force, for we cannot see how a demand for royalty can reasonably be related to the methods or costs of working. On the other hand, we think that the right of the lessor to claim way-leave for outstroke working cannot be easily brushed aside. One way of avoiding the difficulties of the present

situation would be to prescribe a maximum for the way-leave royalty and to require that this should be fixed in negotiation with and be payable to only one party, *e.g.*, the immediate lessor of the mine-owner. We think, on the whole, however, that the problem of instroke and outstroke workings cannot be satisfactorily settled, in a simple manner, so long as innumerable parties interested as royalty receivers in an area exist. We shall take up this question again in a subsequent chapter dealing further with royalties, salami and other difficulties present in the private ownership of mineral rights.

Disabilities Of Zamindars.

15. Earlier in this chapter we referred to the difficulties experienced by zamindars in enforcing their rights as the owners of the mineral. Apart from the fact that a zamindar is frequently unable to enforce proper working, there are a number of other disabilities also from which he suffers. He has no easy means of realising his royalty and other dues and we understand that arears run into many lakhs of rupees. Again, though the lease-deed nominally provides for the approval of a zamindar to the sub-leasing of an area, he is relatively powerless in preventing excessive fragmentation. According to the accepted interpretation of the Transfer of Property Act, sub-leasing cannot be absolutely restricted and consent may not be arbitrarily withheld. The right to transfer or sub-lease is incidental to and inseparable from the ownership of a property and from the earliest times the Civil Courts have leant against any device to render an estate inalienable. With the best of intentions, therefore, a zamindar is unable to exercise a healthy restraint on the tendency to fragmentation. Arising out of this is the further difficulty that, when a lessee sub-leases his leasehold, there is no privity of contract between the original superior landlord and the actual mine-owner; in such circumstances the process of realising royalty and enforcing the terms of the lease by the superior landlord on the mine-owner becomes most complicated. In existing circumstances, we do not think there is any easy remedy which can overcome this and other minor difficulties, but we mention them nevertheless for later use. Here we shall only say that there is overwhelming need for regulating the leasing and sub-leasing of land with the object primarily of preventing the excessive sub-division of a holding. In this we are repeating the recommendation that was made over 25 years ago by the Coalfields' Committee, 1920.

General Policy In Regard To Mining Leases.

16. Hitherto we have dealt with the defects in the present system for the grant of mining leases and have suggested certain improvements, but there are much broader issues also involved, to some of which passing reference has been made earlier in this chapter. The grant of mining leases involves a number of questions :—

(*a*) the decision that further development in a partially developed area should take place or that an undeveloped area should be opened up, and where possible, the laying out of an area in an orderly and predetermined manner;

(*b*) the laying down of general conditions for the grant of prospecting licences and mining leases;

(*c*) the selection of suitable individuals for the grant of prospecting licences and mining leases and approval of the areas proposed to be taken up; and

(*d*) the amplification of the general conditions mentioned in (*b*) above having regard to any special considerations that may exist in particular cases.

In British India, mineral rights, where they vest in the State, belong to the Provinces which, therefore, control also the grant of mining leases. Though the Central Government had framed certain rules in this matter of mining leases, they have been adapted and modified by the Provinces, which are free to adopt any policy they choose. This freedom extends not merely to the terms on which leases may be given but also to the manner or the stages in which an undeveloped or partially developed area may be opened up. We have suggested earlier that there is overwhelming need, in the present circumstances of the coal industry in India, to direct the very considerable expansion that is necessary into sound channels. We must aim, as far as possible, to produce coal in the areas most conveniently situated to consuming centres; as a corollary, we must guard against over-production in other areas, because of the consequences this would inevitably have on future production and on the transport system of the country. It is necessary also that coal production should conform, in the matter of the quantities produced of the different classes, to actual consumer requirements. If these objectives are not properly safeguarded, the future development of the coal industry may be prejudiced. On the first of the four questions mentioned above, we, therefore, feel that it is essential to produce and to work to a co-ordinated all-India plan of further development. Such a plan would naturally be drawn up in consultation with the Provinces and States involved; and with the recent experience of the planned allocation of projected industrial development as between the Provinces and States, we do not think it would be over-optimistic to expect that the willing co-operation of the Provinces and States will be readily forthcoming. Amongst the merits of such a plan, one of the most important would be the provision of transport facilities to suit the needs of increasing production. Of almost equal importance are uniform conditions for prospecting licences and mining leases. The terms of the mining leases should naturally cover such technical considerations as are of general applicability in all sound mining practice. The need for co-ordinated or unified action in this matter is, we think, self-evident. The same need does not, however, exist in regard to the selection of individuals for the grant of prospecting licences and mining leases. Provided the Provinces and States equip themselves with suitable technical assistance, as suggested by us earlier, they should be in a position to judge an applicant's suitability and when a tract has not been laid out in a pre-determined manner, to decide the suitability of the area proposed to be taken on lease. The technical scrutiny that will precede the grant of the lease will indicate the need for possible amplification of the general conditions, having regard to special considerations that may exist in particular cases. But in both these matters, the Provincial Governments and Indian States should be able to call upon a Central co-ordinating body for such advice or assistance as may be necessary. Lastly, we would repeat the importance of uniformity of royalty rates. In this matter, the pecuniary interest of the Provinces and States are directly involved and standardization can only be effected in consultation with and with the help and co-operation of the various units.

Conclusion And Recommendations.

(1) It is not necessary to extend the period of validity of a prospecting licence beyond the present maximum of 3 years.

(2) **Mining leases should be for a period of 60 years with the option of renewal for a further 30 years.**

(3) **Technical advice should always be associated by Government with the grant of a licence or lease and the development of an area. Where possible an area proposed to be developed should be laid out in a pre-determined manner having regard to all relevant technical considerations.**

(4) There are certain serious defects in the mining leases granted in the Permanently Settled areas of Bengal and Bihar.

(5) We consider that there is no justification for the levy of salami which has been responsible for certain serious evils in the development of the Bengal and Bihar fields.

(6) **There should be uniformity of royalty rates in the future** ; as to whether existing rates should be revised should be considered after Government take a decision on our proposals in Chapter XIV.

(7) The absence of instroke and outstroke rights in certain leases leads to difficulties, but in existing circumstances there is no simple solution of the problem.

(8) In all the above matters, we would like to see the Indian States co-operating to secure uniformity of policy and practice.

CHAPTER XIII

FRAGMENTATION AND IRREGULAR BOUNDARIES

Recent growth in the Number of Mines in Bengal and Bihar.

In the following table, we give the number of coal mines that were working in the Provinces of Bengal and Bihar and their approximate output (in million tons).

Year	Bengal		Bihar	
	No. of Mines	Output	No. of Mines	Output
1936	156	6·67	268	12·02
1937	168	6·53	337	13·84
1938	181	7·75	365	15·36
1939	175	7·59	333	14·79
1940	165	8·45	318	15·34
1941	171	7·93	331	15·82
1942	168	7·64	462	15·92
1943	167	6·69	500	13·58
1944	183	6·79	555	14·36
1945	216	7·29	594	16·59

A study of these figures discloses the following features :

(*a*) In Bengal, the increase in the number of collieries from 156 in 1936 to 181 in 1938 was accompanied by an increase in output of 1·08 million tons, but 165 collieries in 1940 produced 0·7 million tons more than in 1938. The production of 183 collieries in 1944 and of a much larger number in 1945 fell short of the 1940 output by 1·66 and 1·16 million tons respectively.

(*b*) In Bihar, if we ignore minor fluctuations, there was a more or less steady increase in the number of collieries over the period and the output too shows a progressive rise until 1942. In the subsequent two years, however, the very considerable increase in the number of operating cllieries not only does not result in any increase in output but is accompanied by a sharp decline, and while in 1945 there were about 76% more collieries than in 1937, the output is higher by only about 20%. The comparison is more unfavourable as between the years 1942 and 1945 ; there was an increase of 29% in the number of operating collieries, but output rose by just over 4% only.

The conclusion is, therefore, obvious that an increase in the number of operating collieries has not always been accompanied by a proportionate or even a reasonably proportionate increase in output. So far as we have been able to ascertain, this was due primarily to the increase in the number of small collieries.

2. Looking at the same question from another angle, we find that there was in the years from 1936 to 1945, a total increase of about 386 operating mines in the two Provinces. We attempted to find out how many fresh leases had been given out by the zamindars during these years by addressing the Panchakote, Nowagarh, Burdwan, Ramgarh, Jharia and Cossimbazar

Rajs, but have received replies only from the Panchakote and Burdwan Rajs. In these two estates, a total of 63 new leases were granted during the ten years. We doubt whether the number of original leases granted in all the six estates would account for very much more than half the increase in the number of operating mines. The other half have probably come into being as a result of sub-leasing and under-leasing by lessees or sub-lessees or as a result of partition amongst heirs or other joint holders of a property. Of these, sub-leasing and under-leasing are perhaps the main reasons for the increase in the number of working mines. In the previous chapter, we referred to the bearing of salami on the sub-leasing or under-leasing of coal-bearing properties. Many of the original leases taken from the zamindars were for large areas which, for primarily economic reasons, the lessees have been unable to develop themselves. With the concentration of the better coal-bearing areas in the hands of the few original lessees, it was natural that the coal industry had to depend, for its growth, to a large extent on sub-leases from the original lessees. The latter, in consonance with the practice that by then had been, more or less, universally recognised in the coal industry demanded the payment of salami as a condition precedent to the grant of a sub-lease. These sub-leases were not necessarily of small areas, and when an operating sub-lessee fell on evil days or desired a quick return on his capital outlay, he had a ready means available to him in the under-leasing of a portion of his holding and levying salami in his turn. In the result, it is not uncommon to find a series of lessees, sub-lessees, and under-lessees interposed between the zamindar and the actual mine-owner. In the course of sub-leasing or under-leasing, little attention has been paid to the need for a proper lay-out of a property and in the words of the Coal fields Committee, 1920, we find that there are in existence a number of properties " of small dimensions and fantastic shapes ". What extraordinary shapes leases can take is well illustrated from the two sketches which we attach as Appendices XV and XVI ; these portray actual existing conditions in the Bengal and Bihar fields. Sub-division of a lease in another manner was drawn attention to by the Coal Mining Committee, 1937, in their discussion of the lay out of certain properties in the Tisra Mouza of the Jharia field. To a certain extent the " fantastic shapes " of existing properties are the result also of the limitations placed on the zamindars by the nature of their mauza boundaries. The boundaries, which are fixed by the Revenue authorities, often take an odd course. It is possible, in such circumstances, that a long narrow stretch of property in one mauza would abut into the adjoining one and if the zamindars are different, the leased areas will necessarily take curious shapes.

Previous Consideration Given to Fragmentation.

3. The Coalfields Committee, 1920, were of the opinion that the "small dimensions and fantastic shapes ", which leases have sometimes taken, made it quite impossible to work the coal in such areas satisfactorily. For the future, the Committee thought that the remedy lay in regulating the leasing or sub-leasing of coal-bearing lands. But past mistakes could be rectified only by bringing lessors and lessees of neighbouring mauzas or leased areas to terms in order to avoid the loss of coal that might result from irregular boundaries. The Committee considered it feasible to provide for rectangular boundary lines between different coal properties within the same mauza, but when such properties were situated in adjoining mauzas owned by different persons, power would have to be taken to intervene between the lessors and lessees concerned so as to bring about an equalisation of underground boundaries without detriment to the interests of either party. We have

referred to the recommendation of the Coal Mining Committee, 1937, that power should be taken to control new leases and to secure the amalgamation of small properties and adjustment of irregular boundaries ; in addition, the Committee considered it necessary to arrange for the transfer of isolated coal-bearing areas which could not be conveniently worked from the parent property because of faults or other geological disturbances.

Government have taken no action so far either to control the grant of leases or sub-leases in the Permanently Settled areas or to secure the amalgamation of small, curiously-shaped properties. The need for control of sub-leasing is as pressing as the need for regulating the grant of original mining leases. The indiscriminate sub-leasing of coal-bearing properties is harmful to the national interest to the extent that it retards the orderly development of an area. Orderly development in this context means not merely the extraction of the maximum amount of coal in accordance with the planned programme, but also the avoidance of waste and the extraction of such classes of coal only as may be needed. In the previous chapter, we referred to the relatively powerless position of the zamindars in preventing indiscriminate sub-leasing and have suggested, in agreement with the two previous Committees, that the grant of original leases and of sub-leases should be regulated. The object should be to ensure that the area proposed to be sub-leased is suitable in all respects for being worked in a systematic and economical manner. There will be few, we think, who would quarrel with the suggestion that the presence of faults and disturbances or the shape of an area have an important bearing on the economic and systematic working of a coal-bearing property. It is around the question of the size of an area that argument centres.

Our Consideration Of The Question.

4. In our consideration of this question, we accepted the conclusions of the previous Committees that small coal-bearing areas cannot be worked economically and systematically from the point of view of sound mining practice. In reality, however, it is incorrect to treat economic working and systematic working as two different factors. Defective mining methods may not necessarily be uneconomic from the strictly limited view-point of a mine-owner ; if his concern is for a quick return, rather than for the development of his property for maximum eventual extraction, defective mining methods can be very paying indeed. But if an area is worked in a manner that would prevent maximum extraction either within that area itself or in an adjoining one, the country's interests as a whole are definitely prejudiced. The harm is greater when the losses or incomplete extraction appertain to the better classes of coal of which the country's resources may be comparatively limited. The economics of mine-working must, therefore, be looked at also from the point of view of national interest and, if this is done, economic working and systematic working will be found to be indistinguishable.

5. Unsound working, in the broad sense, is not necessarily related to the size of a mine. Large well-equipped mines have also resorted to mining methods which are detrimental to the country's interests but in such cases there is no inherent difficulty in securing a change of mining methods. On the other hand, it has been alleged that coal extraction in small and curiously shaped mines is generally beset with certain difficulties which cannot be adequately overcome, even in the best of circumstances. It is further stated that the presence of small mines is objectionable in another respect also ; it prevents centralised production over an area and denies the benefits of

planned extraction. A number of different mines operating in an area may thus constitute a duplication and waste of effort and equipment and a relatively less profitable use of capital.

As regards the technical disadvantages of working small mines, the following have been mentioned in the evidence tendered before us :

(*a*) Considerable quantities of coal are lost in the barriers that must be maintained between adjoining properties, a loss which could have been obviated had the different collieries been worked as one unit.

(*b*) As a rule, small collieries with their limited capital outlay are unable to afford modern equipment and their operations are frequently carried on at shallow depths. The coal at greater depths cannot be properly worked within the limited size of a holding and is left unexploited and is, therefore, lost to the country.

(*c*) In the desire for an early return on the capital invested and because such return cannot be delayed long pending orderly development, unsound mining methods are adopted, principally in the form of a higher rate of extraction in first working and of pillar robbing. In present circumstances, such mines are also unable to afford the expense of depillaring with stowing.

(*d*) There have been cases in which fires have occurred in small mines and the owners, lacking adequate resources, have abandoned them, thus endangering adjoining mines.

(*e*) The collieries are not technically equipped to cope with badly faulted areas and leave them unworked with resulting loss of coal.

On the economic side, the following defects in small collieries have been mentioned :—

(*a*) The capital invested in each of a number of small adjoining mines is insufficient for systematic development on modern lines but in the aggregate may be more than enough for a central scheme of production.

(*b*) In times of depression, these collieries are compelled to cut their prices or even to go out of business. This leads to cut-throat competition, and, besides having an unstabilising effect on the price structure throughout the industry, means loss of output to the country and also danger of permanent loss of coal.

(*c*) Small collieries have frequently not the means to engage experienced technical personnel and to give reasonable facilities and amenities to their labourers.

6. Presenting the other side of the picture, witnesses have told us that " whether a colliery holding is economic or uneconomic depends on the depth and available thickness of the workable seams. A very thick seam lying at a shallow depth can be operated economically by a small holding. An area of 50 bighas of coal land with two thick seams outcropping thereon may be a better business proposition than a 500 bighas area with one or two thin seams disturbed and cut up all over by dykes and faults or with highly inclined coal seams." Others have stated that small holdings do not necessarily mean uneconomic holdings; underground working conditions, siding facilities, the presence of water in the mines, geological disturbances, the thickness of the seams and the depth at which they occur, all have their bearing on this question, and even a large area may prove to be uneconomic if

all or some of these factors react adversely. The Indian Mining Federation and the Indian Colliery Owner's Association have further dealt with the question of small colliery holdings in a supplementary statement which they sent to us on the 11th of July, 1946. Briefly, the arguments advanced are as follows :—

(*a*) The loss of coal in barriers between small holdings is not larger than if they are worked as one unit. Dealing with the 12 collieries in the Tisra group, it is pointed out that the loss in barriers is only about 9% ; if these collieries had been worked as one unit, the adoption of the panel system of working would have been inevitable and the loss of coal, according to the Federation and Association, would have been at least 18%.

(*b*) It is wrong to suggest that the danger of communicated fires is greater in the case of small holdings The 50 ft. barriers provide a better safeguard against the spread of fires from small collieries than would be the case in larger units. The coal lost by fires and collapses is generally much smaller in the small collieries as can be inferred from the fact that they generally work the inferior grades of coal and, according to the Coal Mining Committee, 1937, the loss of inferior coals up to 1936 in the Jharia field was only 578,000 tons as against the loss of 29,191,432 tons of Selected and Grade I coals.

(*c*) As regards the suggestion that the existence of a number of small collieries results in the inefficient utilisation of capital, it is pointed out that some companies with much larger capital produced a relatively smaller quantity of coal than a group of small collieries.

Mr. S. C. Ghosh also has ardently pleaded the cause of the small collieries. So long as a mine yields an adequate return to the owner, Mr. Ghosh would not consider a charge of uneconomic working justified. On fragmentation, which is the principal reason for the emergence of the small colliery, Mr. Ghosh puts forward the view that the considerable increase in coal production that is necessary in India can be secured only by the compulsory fragmentation of colliery holdings. He would force " colliery companies holding large areas either to develop and raise coal from the entire area or to fragment their properties and lease out to others so that more coal may come out of the mines to meet the immediate need of the country ". In such fragmentation, the main considerations to be borne in mind should, according to Mr. Ghosh, be the number of seams in the property within a certain depth, the depth of the seams, the total quantity of the coal available and the geological and geographical position of the property. We shall deal with this point in the next chapter.

7. The question of uneconomic colliery holdings is one of considerable improtance and we have given the most careful consideration to the various views urged before us. We agree that a number of the factors mentioned and some others, such as the quality and structure of the coal, the nature of the roof, the percolation of water and the proximity of dangerous workings, determine to a large extent the possibility of working an area in a systematic and economical manner. But when all these have been taken into consideration, it is the care with which workings are planned and implemented and the size of the area that finally determine the relative economics of coal mining. In the light of our own personal impressions and after

very earnest consideration, we have come to the conclusion that small mines connot, in the majority of cases, plan their development work and future workings with the care and thoroughness that is essential in good mining. It is not necessarily due to the lack of a desire to plan well that this happen ; not infrequently, it is the inability of the mine-owners to secure the best technical advice and their further inability or unwillingness to overcome, necessarily with the expenditure of money, obstacles encountered during mining operations. In implementing a sound plan of development small capital acts as a definite limitation on the adoption of modern methods of mining; and, in practice, the working methods of small collieries leave much to be desired, with, of course, certain exceptions.

We are not much impressed by the suggestion that larger quantitites of coal are lost in barriers around small holdings, though we can conceive that in certain circumstances and even in the instance cited by the Federation and Association, much less coal would be lost if an area were laid out and worked in an orderly manner, but not neccessarily as one unit. But the smallness of a holding reacts in another way: the majority of small workings are shallow and in the event of fire, the barriers are less effective as a safeguard, since collapses take place to surface and the fire obtains the necessary air for its propagation. Such barriers have proved useless in small plots in the Jharia and Kari Jore areas of the Jharia field. Coal left in barriers act as an effective safeguard against fire only at depths where the seams have no direct access to the surface and cannot be fed by fresh air in the event of a fire.

We do not attach much importance either to the point about the comparatively limited quantities of inferior coal lost in fires and collapses. The quality of the coal largely determines the susceptiblity to spontaneous heating. In mining, occurrences of fire are likely in spite of all precautionary measures ; and what is, therefore, important is the prevention of the spread of fire, when one does occur. As regards this, we have referred to the comparative ineffectiveness of barriers in shallow mines and we would point out that in the Jharia and Kari Jore fire areas several million tons of good coal were lost as a direct result of fires which originated in small adjoining mines. It should not also be forgotten that in the Raniganj field the inferior coal lost by fires and collapses is, relatively to output, many times more than the loss of better grades.

It is equally impossible to accept the suggestion that the percentage of extraction in small holdings is larger than in bigger mines. In some cases that we are aware of, the depillaring areas have been so small that a complete ' break ' or subsidence to surface has not been obtained and a good deal of coal has been lost due to the crushing of pillars. In such cases, the facility of systematic pillar extraction that obtains in larger properly developed areas is not present. Loss occurs in small mines in another manner also. In times of depression, the owner may not have sufficient capital to invest in the requisite pumping and haulage machinery and the consequence may be that the dip workings may become waterlogged and be abandoned. Unless the old workings are de-watered and worked at a later date at considerable additional expenditure, this coal is lost.

Consideration must also be given to the significance of working at depth, which is becoming increasingly necessary as the shallower seams of coal become exhausted. The deeper the seams to be exploited, the greater is the initial capital expenditure required ; and it follows that there must be a close relationship between this expenditure and the amount of coal to be won, an

that broadly speaking, the deeper we have to go, the greater must be the size of our units of production. A small holding of mineral rights, which may be capable of being worked at a profit in respect of a shallow seam in the area held, may be economically impossible so far as underlying seams are concerned ; and in such cases, the deeper coal cannot be won unless contiguous holdings are amalgamated.

The Indian Mining Federation and the Indian Colliery Owners' Association have not, in our opinion, appreciated fully the criticism about over-capitalisation in the aggregate of a number of small collieries. Comparisons of output and capital can reasonably be made only in like working conditions and it is misleading to draw a superficial comparison between a group of small collieries working shallow coal with other large well-equipped mines working deeper seams under much more difficult working conditions. In bringing in the railway collieries for adverse comparison, the point has been overlooked that, as a matter of policy, these collieries have been working much below their economic capacity. The real question to consider is whether the capital invested in sinking by a number of small collieries could not have been utilised to greater advantage in the provision of modern mining equipment, had the collieries been worked as a group. We have no doubt whatsoever as to what the answer to this should be. It is a half-truth, in this context, to say that a thick seam lying at a shallow depth can be worked economically by a small holding ; the fact is that such a holding can be worked more systematically and economically if amalgamated with an adjoining one. To argue, as has been done before us, that the small colliery plays the same role as cottage industry betrays an imperfect understanding of the meaning of the term.

Labour conditions in the small collieries compare unfavourably with those in larger units. In this matter, as in the comparatively poorer technical assistance available, it is finance that acts as a limitation.

8. The conclusion we draw from this review is that small mines tend to be uneconomic and harmful, but this is not to say that all small mines are uneconomic or harmful. There may be, and to our knowledge are, a number of them working on scientific lines and without detriment to their or their neighbours' or the country's interest. Against such mines we have no complaint. But if a mine is so small as to prevent systematic mining with maximum exploitation of its coal or the coal in an adjoining mine, we think that definite harm is being done and that the State should intervene to improve the situation. On a somewhat related point, though it does not arise necessarily with reference to small mines, we are aware that irregular boundaries to a lease-hold can and do frequently lead to avoidable losses of coal. The following two cases have been brought to our notice by a witness :

> "(*i*) Between the extreme rise workings of Messrs. Martin & Co.'s Radhamadhavpur Colliery and the dip-most workings of Messrs. H. V. Low & Co.'s Kuardi Colliery there was a strip of about 3,000 ft. long Ghusick seam of an average width of 350 ft. within the leasehold of Kuardi Colliery. This strip of coal being bounded on three sides by faults could be economically worked only from the Radhamadhavpur Colliery, but negotiations for the acquisition of the strip by this colliery fell through because of the demand for excessive salami and royalty. Due to the subsequent extraction of pillars in the Radhamadhavpur Colliery, an area containing about 3 lakhs tons of excellent coal has become inaccessible and is probably lost for ever.

"(*ii*) An area of about 85 bighas containing about 6 lakhs tons of Nega seam coal belonging to Ratibaty Collieries Ltd., has been displaced by a fault of about 100 ft. throw. The fault plan being full of gas under pressure it is not possible to reach and work this coal by driving drifts from the existing pits ; on the other hand, the adjoining Chapui Colliery could work this coal most advantageously. In spite of repeated efforts, a settlement between the two collieries could not be arrived at. Most of the approaches to this solid area have by now probably been closed due to the extraction of pillars in Chapui Colliery, and economical extraction of the coal has become undoubtedly a serious problem."

Improvement in the circumstances stated in this paragraph can be secured only through amalgamation of collieries or an adjustment of boundaries, as the case may be.

9. Before we suggest measures for dealing with the problem of uneconomic collieries, we shall briefly mention the main factors that have been responsible for their growth. These are as follows :

(*a*) Small original leases are granted by the zamindars of which some examples have been given in Appendix XIV.

(*b*) Properties have been sub-leased for salami and royalty to parties with small capital who could not afford to take larger areas, because of the salami demanded and the cost of machinery and plant that would be necessary for developing them.

(*c*) A tenant having paid salami for an area of reasonable size, seeks to recover a certain percentage of his expenditure by sub-leasing, retaining a portion of the area to be worked by himself. The better rates of salami and royalty that have prevailed in the last few years have provided considerable immediate profit, especially as salami, being in the nature of a capital payment, is not subject to income-tax.

(*d*) In a number of cases, sub-division has been resorted to with the object of obtaining more wagons.

(*e*) Splitting up a property reduces taxes.

(*f*) In recent years, when coal prices have been satisfactory, there has been a great incentive to small owners to open any area, however small, preferably of quarry coal, and extract a few hundred tons per month.

Most of these factors will, for the future, be adequately taken care of by our proposal to regulate the leasing and sub-leasing of coal-bearing lands.

Proposals For Dealing With Fragmentation As It Now Exists.

10. We have now to consider how the problem of fragmentation or uneconomic holdings, as it has developed hitherto, should be dealt with. That the position should be set right in certain cases is, in our opinion, beyond question. We have referred to the long narrow strips of coal properties being worked in the Tisra Group ; practically no attempts have been made to amalgamate any of these collieries and the area stands today as it was in 1936. We have also given in Appendices XV and XVI a picture of the extraordinary shapes and relative position of lease holdings in two other areas. In Appendices XVII and XVIII we give two more examples of sub-division which *prima facie* appear to hinder or prevent systematic mining practice. But

it should be clear from our analysis of this question that a decision as to whether a holding is economic or not is not dependent entirely on its size. We have stated that our objectives are the encouragement of systematic methods and the maximum possible extraction of coal in an area. Areas which have been excessively sub-divided must, therefore, be carefully examined with a view to determining whether the sub-divisions militate against fulfilment of these objectives. It would then have to be considered to what extent the process of sub-division must be reversed. It may not be necessary or desirable in all cases to restore the area to its original shape ; at places the process of reversal may already have been rendered impossible. Bearing in mind the factors that determine economic nature or otherwise of a holding, it would then be necessary to devise a lay-out of an area which would permit of exploitation to the best advantage. We have deliberately refrained from laying down any minimum area for a holding. On this point, different opinions have been expressed. Some have stated that the area must depend on the depth at which the coal occurs, one bigha* being considered necessary for each foot of depth. Others think that areas less than 500 bighas or an output of less than 10,000 tons a month in a colliery fully developed should be considered uneconomic. Some again hold that few areas under 200 bighas can be regarded as economic and that areas of 200 bighas and more are themselves uneconomic if they are fragments of a larger area which can be worked as one, thus avoiding the locking up of coal in unnecessary barriers. In the non-Permanently Settled areas of British India, the minimum area for a lease of coal-bearing land is 33 acres, though the authorities are urged to let out larger areas when possible. With only a few minor exceptions, these leases in British India are of substantial sizes and greatly exceed the minimum of 33 acres specified. It is not really necessary or profitable to fix the area beyond which sub-leasing should not extend. All the factors mentioned, *viz.*, the shape and size of the holding, the depth at which the seams occur, their thickness and inclination, the existence of any known dangers, geological features, neighbouring colliery properties and their relative position, must all be taken into consideration in deciding whether a colliery should continue to exist as a separate entity or should be merged in an adjoining one.

11. That such mergers are essential we do not doubt. There has been a considerable campaign against small collieries in other countries also. In the U. K. the Mining Industry Act of 1926 provided for the preparation of schemes for the amalgamation of collieries—

(*a*) when the owners agree, and

(*b*) when one or more owners agree, but others, the amalgamation of whose mines is considered necessary, do not.

Taking this matter further, the Coal Mines Act, 1930, set up a Coal Mines Re-organisation Commission with the object of assisting, by the preparation of schemes or otherwise, in the amalgamation of coal mines when such amalgamation appeared to be in the national interest. The Coal Act of 1938 set up a new Coal Commission with the duty of endeavouring to effect a reduction in the number of separate undertakings consisting of or comprising coal mines to which the coal in any area is leased, when it is clear that the number of such undertakings is so great that it is detrimental to the efficient working or disposal of coal. We understand that in practice these provisions did not materially assist in overcoming the problems of fragmentation. To some

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A bigha is equal to approximately $\frac{1}{3}$ acre.

extent fragmentation was reduced in consequence of vertical integration during times of depression. Partly, too, we understand, the need for amalgamation disappeared in consequence of the operation of the Coal Mines Act, 1930, in reference to the regulation of the production, supply and sale of coal. We do not think that it will be profitable in India to initiate action for voluntary schemes of amalgamation, for we are doubtful whether voluntary amalgamation will be effected on any appreciable scale. For this reason, the appointment of a Special Officer to act as mediator between various owners will serve little purpose. In the circumstances as they exist in India, the only solution is for Government to insist on amalgamation when it appears that the separate existence of two or more adjoining collieries is harmful in the broad sense. Once it becomes clear to the owners that amalgamation is inevitable, financial arrangements between them may become easier of settlement. But if, in particular cases, amalgamation cannot be achieved, because of the recalcitrance of any of the parties involved, we think the State should step in and acquire the properties and operate them, after necessary reorganisation, in the same manner as the railway collieries. This is the measure of the importance we attach to the need for eradicating harmful fragmentation where it exists.

Conclusions And Recommendations.

(1) The large number of small holdings have resulted from various causes, the principal amongst which is the practice of salami.

(2) The uneconomic nature of an undertaking should be judged from the broad angle of national interest. From that aspect small mines, with exceptions, tend to be uneconomic and harmful.

(3) **For the future fragmentantion should be avoided by a control over leases and sub-leases.**

(4) **The evils of the past can be remedied only by Government insisting on amalgamation or an adjustment of boundaries. This should be preceded by a detailed field survey of existing conditions.**

CHAPTER XIV.

OWNERSHIP OF THE MINERAL.

Disadvantages Of The Private Ownership Of Mineral Rights.

It is the ownership of coal rights in the Permanently Settled areas of Bengal and Bihar that we shall consider in this chapter. In Chapter XII we have dealt with the main disadvantages that have resulted from the private ownership of coal rights. For the sake of completeness, we summarise them below :—

(*i*) Leases have been given of very large areas at nominal or small rates of royalty and on a semi-permanent basis. This has resulted in the concentration of good coal-bearing areas in the hands of a few individuals or concerns who have themselves developed only small portions of their areas.

(*ii*) The system of salami, with its inevitable consequence of excessive sub-division, has flourished.

(*iii*) Royalty rates vary very considerably even to the present day and no attempt at standardisation has been made.

(*iv*) Zamindars are unable to enforce effectively lease provisions regarding systematic working methods and maximum extraction. The difficulty increases when an area is sub-leased or under-leased. Not infrequently the lease provisions themselves are defective.

(*v*) Zamindars have not the technical knowledge or assistance to lay out an undeveloped or partially developed area in an orderly manner or to judge the suitability of an area proposed to be taken on lease. In the exploitation of so vital a mineral as coal, a comprehensive plan of development for the country as a whole is essential.

(*vi*) The private interests of the zamindar or the lessee or a sub-lessee will not coincide at all times with national interests.

(*vii*) There are, in addition, a number of disabilities from which a zamindar suffers, such as those arising in the recovery of his dues and enforcing his right of re-entry in certain circumstances.

2. Arising out of (*i*) above is the possibility that further essential development may be retarded by difficulties created through the excessive financial expectations of the lessees or sub-lessees.

That intermediary owners of mineral rights have demanded high rates of salami and royalty is indisputable ; in the following table we quote a few examples of royalty paid or payable to the zamindars and to intermediary interests in 1945 :

Colliery	Royalty payable to zamindar			Royalty payable to intermediary holders		
	Rs.	A.	p.	Rs.	A.	p.
A	34,405	13	6	56,561	13	0
B	79,625	1	7	1,34,166	9	6
C	1,196	0	0	3,588	0	0
D	1,93,739	0	0	2,27,883	0	0
E	3,516	3	7	7,200	0	0

We have seen also the following instances of royalty paid to intermediary holders :

Despatches	Royalty
(Tons)	Rs. A. p.
3,648	4,344 14 0
29,848	67,157 3 0
39,199	31.574 0 0

In the previous Chapter we mentioned one example of an alleged excessive demand for royalty payments, as between two reputable and progressive concerns, which has led to the loss of a large amount of coal. That intermediaries can and do demand rates of royalty totally unrelated to their liability to the zamindar or to their predecessor in rights and to their effort and expenditure on prospecting and proving an area is beyond doubt. For the future, at least, the defects of the existing situation could be removed by statutory regulation of salami and royalty rates, but we see no easy way of bringing order into the chaos of the past. It may also be necessary, at times, to enforce the surrender of such portions of leased areas as are not likely to be worked within a measurable distance of time, as this may be essential in the interests of increased production. We are, however, not in favour of placing such a power in the hands of zamindars, for, even when vested in Government, it will have to be exercised with great care. The failure to develop and work an area may be attributable to perfectly sound reasons, technical and otherwise ; and provided the intention is to undertake development within a reasonable period of time, the lessee should obviously be left in possession of his holding. The exercise of this power in an arbitrary manner would be a very serious matter.

3. As regards salami and royalty rates, we have already recorded our conclusion that the first ought to be abolished and that the second should be placed on a uniform basis. Even under existing circumstances, we see no inherent difficulty or injustice in the abolition of salami. But the standardisation of royalty rates is a complicated matter. While it may not be impossible to frame and enact legislation for securing this object, there will be curious consequences. Payments to a zamindar or a lessee or a sub-lessee may increase and this would be a wholly un-earned and undeserved increment. There may also be cases of decreased royalty receipts. But the most serious difficulty would be that of apportioning any increase or decrease equitably between the layers of zamindar, lessee, sub-lessee and under-lessee. One of the objects of standardisation is to secure uniformity in the incidence of royalty on the person actually producing the coal ; but we can see no simple way of distributing the variation from the old rate of royalty amongst the many parties that may be interested in the coal as intermediary holders. The present ownership of coal rights, therefore, acts as a barrier against the standardisation of royalty rates.

It may incidentally be asked how standardisation, secured by fixing absolute rates of royalty payable by the mine-owner, can be reconciled with the sub-leasing of properties, since the basic consideration in such sub-leases is generally the profit motive. We are aware of this fact but we have made it clear that we are not enamoured of sub-leases in reference to coal properties. We would like the person operating a mine to be in direct contact with the owner of the mineral, for that would obviate many of the difficulties of the present situation in Bengal and Bihar. In effect, therefore, there would be no incentive to sub-leasing.

4. Much has been written already on the disabilities of zamindars in the Permanently Settled areas. While some of these could undoubtedly be removed by legislation, it is pertinent to ask, for example, whether, in the light of history, zamindars can be trusted to secure due observance of the technical provisions of leases. Moreover, they would have to be armed for this purpose with powers which cannot lightly be conferred on private citizens. The duty of ensuring compliance with what is considered to be in the public interest must undoubtedly be that of the State. This responsibility could, of course, be undertaken by the State even in present circumstances, but there can arise matters, as we have said, in wh ch private and national interests may be opposed to each other. We believe, too, that in so vital an industry as coal, it is most desirable to prevent continuing difficulties between the private owners of coal rights and the operators of mines.

5. Lastly, we are certain that the orderly development of coal-bearing properties in the interests of the country as a whole is not possible so long as mineral rights vest in private hands. That such orderly development is essential will not be denied ; that there has been no attempt at plant ning in the past and that it is improbable and will be difficult in the future, in the existing order of things, is equally clear to us. Zamindars and intermediary holders cannot be expected to take the broad view, for they are not equipped to do so. Their personal interests will naturally come first ; and a careful husbanding of resources and planned deferment of exploitation are not infrequently the antithesis of such interests. On the other hand, the State can and must regulate exploitation in accordance with a pre-determined plan

6. Our conclusion, therefore, must be that the state acquisition of mineral rights is the only solution of these difficulties. Another strong consideration reinforces this conclusion. It is possible that in years to come, perhaps yet some distance in India, our coal industry will be nationalised, as in the United Kingdom recently. There are already many sign-posts pointing in that direction. And nationalisation of the industry almost postulates nationalisation of mineral rights. Thus, both as a solution for present day problems and as planning for the future, the acquisition of mineral rights by the state is essential. for this view we have found overwhelming support in the evidence tendered before us. In the United Kingdom mineral rights were acquired over 8 years ago for much the same reasons as have weighed with us.

In speaking of the acquisition of mineral rights, we have accepted the position that these now belong to the zamindars in the permanently Settled areas. The matter has, however, not always been free from doubt. That there is nothing sacrosanct about these rights is clear from a study of the laws prevalent in India in ancient times. Manu stated[1] that the King as " overlord of the soil is entitled to one-half of all minerals and treasure-trove." Kautilya's Arthashastra, date between 321 and 300 B.C., states[2] that—

> " those mines which require large outlay to work out may be leased out for a fixed number of the shares of the output (Royalty basis) for a fixed rent. Such mines as can be worked out without much outlay shall be directly exploited (by Government agency)."

It has, at times, been suggested that the State could, even now, assert and establish its right to the minerals, but, in the face of the long acquiescence of Government in the private enjoyment of mineral rights, we do not desire to raise the point. This, too, was substantially the conclusion of the Coal fields' Committee, 1920.

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1 Manu Dharma Shastra, Chapter VIII, verse 39.
2 Dr. Shama Sastry's Edition, 1929.

Past Consideration Of The Questions.

7. The question of acquisition of mineral rights had been considered by the 1920 and 1937 Committees and we shall briefly refer to their conclusions. The 1920 Committee considered that one of the following three solutions only could rectify the then existing situation in regard to leases, etc.:

(*i*) assertion of the Government's rights to minerals,

(*ii*) nationalisation of mineral rights, and

(*iii*) State control of leases, etc.

As to nationalisation, the Committee stated that it "might have been possible in the earlier days of the industry, but we doubt whether it can now be considered as coming within the sphere of practical politics. We believe that the cost would be prohibitive and the difficulties generally so great as to render the proposal impracticable." In the result the Committee recommended the setting up of a controlling authority with adequate powers to prevent further waste. The Committee's basic assumptions in regard to nationalisation have been falsified by subsequent happenings in at least one other country in the world and we do not therefore think it necessary to labour the point further.

8. The Coal Mining Committee, 1937, observed as follows :—

> "In India, apart from the financial difficulties of any kind of nationalisation, there would evidently be great practical difficulties in valuing ....mineral rights on account of the very large number of persons interested. A special tribunal would have to be set up to value ....royalties, and the process would probably not be completed for about ten years. The serious state of India's coal reserves makes time the essence of the situation and demands that whatever measures of conservation and control are decided on should be put in force as quickly as possible. Further, the fact that, except in Bengal and Bihar, the State already owns the royalty rights over coal has not so far made much difference to wasteful and dangerous methods of working.... We, therefore consider that, for the present at any rate, rationalisation and control on the lines suggested in our earlier chapters is the wisest policy for India more particularly at the existing stage of her development."

The argument is, in part, the same as that of the Coalfield's Committee, but nationalisation is not rejected on merits. Two members, however, of the Coal Mining Committee (Messrs. Nag and Krishnan) wrote a supplementary note and discussed the State acquisition of mineral rights, amongst other things. From a critical review of the then situation, they came to the conclusion that such acquisition allied to nationalisation of the mines, was the only solution to existing difficulties. State ownership of mineral rights would have the following main advantages :

(*i*) Systematic development and working would be facilitated.

(*ii*) Conservation in its broader sense, as applied to the reserves, is possible only under state ownership.

(*iii*) Questions such as adjustment of boundaries, amalgamation of small properties, wayleave etc., will not arise.

The members then go on to suggest the action that should be taken and we can do no better than reproduce their observations :—

" In the first place, the coal areas which have hitherto been considered to be of no value should be declared as belonging to the State. Under this category will come all areas in which coal has not been proved so far, and properties in which no development has been done or contemplated. This will also apply to coal lying at depths of 3.000 feet and deeper, for no exploration has been done to this depth nor has any company included such coal under their probable reserves. "

" The above suggestion is similar to the recommendations made by the British Royal Commission on the Coal Industry (1925) (see pages 78-79 of Volume I of the Report of that Commission). They said :—

" There is one aspect of the question which is simple, and with regard to which the course is clear. It relates to coal which at present has no market value, and for which therefore no claim, for compensation can arise.

" In this class, for instance, is coal the existence of which in workable quantaties is unknown. The Kent coalfield was in this category not very many years ago. There may be coalfields in other parts of Great Britain that are still unsuspected. A person who owns land under which there is in fact workable coal, although no one knows that it is there, possesses no extra market value, above the value of his land for agriculture or other purposes, on account of the unsuspected presence of the coal. He loses no existing possession if the State, as an act of policy legislates to the effect that all such coal shall vest in public ownership. What he loses is the possibility of a sudden unforeseen enrichment if it should happen that coal were in fact to be found in the future under his land. We consider that it is in the public interest that legislation of this nature should be passed.

" In this category again is coal which is situated below the level of 4,000 feet (by the Ordnance Datum) ; this is now regarded as unworkable. Both the Royal Commission on Coal Supplies of 1871 and that of 1906 accepted that depth as the workable limit, and excluded from their estimates of the coal resources of the country all deeper levels. The Coal Conservation Committee of 1918 saw no reason to depart from that decision.

* * *

'It would have been a lack of foresight if, in assuming the ownership of coal which now has no market value, the State had omitted this category from consideration. We recommended that it should be included.

* * *

' With respect to other coal, we recommended that the principle of State purchase should be applied '.

" *The Acquisition of Royalty Rights.*—The owners of coal lands in Bengal and Bihar are Zamindars under the Permanent Settlement. Between them and the actual operators there are frequently two or more intermediate lessees, each taking a share of

the royalty. Most of the earlier leases have been given by the Zamindars on receipt of a lump sum payment (premium or *salami*), for periods up to 99 years (long lease) or up to 999 years (perpetual lease). At the present day they receive only a comparatively small sum as rent or royalty. Probably 60 per cent. of the coal areas are on leases of this description. The more recent leases for shorter periods (varying from 20 to 50 years, with option of renewal) and at higher rates of royalty

" The present average royalties, including all the beneficiaries, are not more than 6 annas per ton of coal, calculated on despatches Taking the annual despatches from the Bengal and Bihar coal fields as about 18 million tons, royalty on this will amount to Rs. 67,50,000. This, if capitalised at 20 times for the purpose of paying off the present owners, will give a figure of Rs. 13,50,00,000. Actually the capital needed will be less since some of the collieries are approaching exhaustion. A sum of Rs. 13,00,00,-000 (thirteen crores) may, therefore, be taken as a fair estimate.

'The above, *i.e.*, the purchase of royalty rights, is an essential preliminary to the acquisition of the mines themselves, and independent of it. It will enable the Government to assume the ownership of coal in place of the various private interests. Even in England, where private ownership of minerals is held sacrosanct, the Government have announced in Parliament (on 9th March 1937) the appointment of a tribunal presided over by a Judge to go into the question of the purchase price of all royalty rights, which now belong to numerous owners of surface lands. This step was recommended by the British Royal Commission on the Coal Industry of 1925 (see Chapter VII of the Report of that Commission).

" This step will vest the Government, as owner of the mineral, with powers of supervision and control, which they do not possess at present, and which they can use without any interference. These powers are essential for the well-being of the industry and for ensuring both safety and conservation. The royalties can then be made uniform for each class of coal as far as possible, and can be unified and consolidated with the various rate sand cesses nowpaid by the industry, reducing thereby the complexity and expenditure incurred on their collection.

" It will be seen that the investment of a sum of Rs. 13,00,00,000 on the purchase of royalty rights will bring an annual return, in the shape of royalties, of Rs. 67,50,000. Whether the mines continue as private interests or are completely State-owned, the basis of royalty payment will remain; in the former case, it will be a direct payment by the lessees to the State, while in the latter it will be included in the working costs and set apart as a separate item.

" Asming the above figures, this royalty will represent a rate of interest of 5.2 per cent. on the capital invested. At present, with plenty of money available in India at a rate of interest not exceeding 3 per cent. it will be easy for the Government to raise the loan of 13 crores and liquidate it in less than 50 years by setting aside 2 per cent. from the royalty receipts, towards re-

demption of capital. This would also allow for a sufficient margin for the costs of collection. After the liquidation of the loan, the income from royalties will be a direct source of revenue to the State and will continue as long as the coalfields last. It should be borne in mind that, with the industrial expansion in India resulting in greater demand for coal, income from royalties will increase in proportion and will enable the Government to liquidate the loan in an appreciably shorter period than that mentioned above. Hence the acquisition of royalties is definitely a paying proposition from the beginning and can therefore be taken up without delay."

We do not agree with the details of the proposals for compensation made above and shall deal with this question later.

9. The Land Revenue Commission, Bengal, also examined the question of acquiring mineral rights and their observations are given below [1]:—

"In fact the advantages of acquiring minerals are more certain than the advantages of acquiring the right to collect rent. Under the present system wastage is prevalent, and conservation from a national point of view is often neglected. The Inspectors of Mines have no powers to enforce conservation or prevent waste, and it is only recently that they have exercised control over working methods in order to safeguard the employees.

"Owing to the necessity of taking leases from different landlords and the fact that the boundaries of the mines often follow entirely unsuitable Revenue Survey boundaries, many mines are worked uneconomically. The number of grades of landlords between the revenue payer and the working Company, all contending for royalties, have had much the same harmful effects as subinfeudation in land.

"It was for these and similar reasons that the Burrows minority report advocated nationalisation of mines, the nationalisation of royalties being the first step. The majority might have made the same recommendation, but they thought that the preservation of the coalfields from deterioration was too urgent a matter to wait the ten years which nationalisation proceedings might take. It should be noted that the acquisition of mines as opposed to the royalties is a much more difficult problem. We are not concerned with it, because the position of the companies working the mines is parallel to that of the actual cultivators working the land. There is no proposal to acquire their rights. The collieries which are worked by the zamindars themselves might be treated as their khas lands and left in their possession subject to the payment of royalty. If they were treated in the same way as agricultural khas lands, they would be acquired and compensation would be paid for them.

"In England, mining royalties have recently been nationalised. The sum awarded was £ 66·45 million. On the English basis of calculation it has been estimated that 2.62 crores might be payable to the royalty holders in Bengal. By a different method of calculation, which unlike the English system, takes account of undeveloped or virgin properties, it has been estimated that the compensation would be 4½ crores.

[1] Report of the Land Revenue Commission, Bengal, paras. 119 to 121.

"The interesting feature of the English scheme is the nominal value it places on assets which are not expected to bring in an income for 20 or 25 years. Owners of a property of which the life is calculated at 52 years will receive 8 times the present income and 11 times the average income. If they invest the proceeds at 4 per cent. they will get an income in perpetuity amounting to one-third of the diminishing income which they are getting at present.

"If Government decide to investigate the acquisition of coal royalties it will be necessary to consult experts as to the proper system of assessing the mineral assets of the estates concerned, and the amount of compensation that will be payable. In the estimate we have prepared for the acquisition of the superior interests in agricultural land, the income from royalties and khas collieries has not been included in the figure for assets.

"Whether or not it is decided to investigate the acquisition of royalties, we should like to recommend that Government should consider the desirability of legislation declaring that all minerals, including oil, not yet worked or discovered, will vest in the State. This has been done in Great Britain in the case of oil."

We are in general agreement with the recommendation of the Committee subject to the observations made below.

The Basis of Compensation

10. We now turn to a consideration of two important matters :

(*a*) the assessment of compensation, and

(*b*) the procedure and the machinery for acquisition.

Before we deal with the basis of compensation, it is necessary to be clear what it is for which compensation has to be paid. Messrs. Nag and Krishnan and the Bengal Land Revenue Commission were agreed that all minerals not yet discovered should be declared by legislation as vesting in the State. The Land Revenue Commission would go further and include in the declaration known but unworked minerals also ; and Messrs. Nag and Krishnan would similarly vest in the State properties in which no development, including prospecting, has been done or contemplated. Presumably, in all these cases no compensation is envisaged, and rightly so, we think, in respect of undiscovered minerals, in any case ; for compensation must be for a felt loss, immediate or prospective. More precisely, we recommend that rights to coal at depths beyond 2,500 feet and at all depths in areas in which coal has not so far been found should be declared as vesting in the State without any liability to compensation. We are aware that Messrs. Nag and Krishnan mentioned depths below 3,000 feet, but we believe that no coal deposits have as yet been definitely proved below 2,500 feet.

The position is slightly different in regard to known but unworked coal deposits which in this connection we define as those not leased out. The failure to work a deposit may be related to its uneconomic nature and the inference may be strongly suggested that development would not normally have taken place within measurable time. But uneconomic is a relative term and the advance of knowledge and the exhaustion of the better deposits may bring under development coal considered to be of no commercial value at present. In this sense, there is a definite prospective loss which must be compensated for. The asset, however, yields no present income, the loss may be a remote one, and so, the measure of compensation must necessarily be different.

11. In the case of areas that are being worked, the only sound basis for assessing compensation is the present or average income accruing to the royalty receivers including all beneficiaries. Compensation in the U. K. was based on a similar consideration though, as pointed out by the Bengal Land Revenue Commission, allowances were made for the anticipated future life of the assets. Messrs. Nag and Krishnan estimated the total of royalty payments in Bengal and Bihar at about Rs. 67 ½ lakhs and suggested that the compensation should be equal to 20 times this amount, reductions being made in the case of collieries nearing exhaustion. Confining its attention to Bengal only, the Land Revenue Commission gave two different estimates of compensation, *viz.*, Rs. 2·62 crores on the U. K. basis of calculation and Rs. 4·5 crores based on Messrs. Nag and Krishnan's estimate and on the further assumption that the despatches from Bengal were approximately 1/3rd of the total for Bengal/Bihar. We are given to understand that the former figure is the total U. K. compensation reduced 33 times, which is approximately the ratio of U. K. output to that of Bengal. But we doubt if this is really sound procedure for it ignores dissimilarities of circumstance that may exist.

In their calculations, Messrs. Nag and Krishnan assumed that the average rate of royalty is about six annas per ton ; on what this figure is based is, however, not stated. With the object of obtaining as accurate a picture as possible, we requested the Mining Associations in Bengal and Bihar to send us details of the despatches and royalty payments (to the zamindars and intermediary holders) of their members for the year 1945. We received 222 complete replies in respect of collieries or groups of collieries whose despatches in the year aggregated 13,159,460 tons, as against total despatches from the two Provinces in the same year of 19,951,516 tons.

Details of the royalty payments reported to us are as follows :

	Rs.	A.	P.
Royalty paid or payable to zamindars	24,95,969	9	11
Royalty paid or payable to intermediaries . . .	11,36,658	5	4
Total royalty paid or payable	36,32,627	15	3

The average rate of royalty payable works out to 4·42 annas per ton and on a *pro rata* basis, the royalty paid or payable on the total despatches from Bengal and Bihar comes to Rs. 60,54,380. These figures indicate that the estimates made by Messrs. Nag and Krishnan were somewhat inflated, but in making calculations of this nature we think that it would be prudent to err on the side of caution and, so, we are assuming that the total royalty paid or paybale might be about Rs. 65 lakhs.

We now turn to the question of capitalising this annual payment. Messrs. Nag and Krishnan suggested a 20-year basis but here, we think, they have erred too much on the side of generosity. It is far from our recommendation to be anything less than fair but we must equally avoid over-generosity at the public expense. In all acquisition proceedings, the certainty of an income is the most important consideration in fixing the basis of its capitalisation, the principle being that the greater the certainty the larger the number of years of purchase. Thus in the case of land, while non-agricultural income usually capitalised on a 20-years' purchase basis, agricultural income is capitalised on the basis of 14 to 15 years' purchase. The reason is the obvious one that agricultural income is less certain, being dependent on natural circumstances over which man has little control; and the prudent investor, therefore,

looks for a higher average annual return to compensate him for crop failures in certain years. This principle is so well-known and so widely accepted that we do not consider it necessary to labour the point further. We think that income from royalties is fraught with greater uncertainties than agricultural income. Mining is a much more hazardous operation and, besides, the royalty receiver is more disadvantegously placed than the owner of agricultural land in the matter of ensuring, so far as lies in his power, that his asset yields the maximum return. There is also the point that the income from royalties is dependent upon the duration of a wasting assest and that the enjoyment of such income is, therefore, terminable and not perpetual as in the case of agricultural land. The basis of capitalisation of income from royalty must, therefore, necessarily be stricter than in the case of agricultural income. We are not in a position to suggest what detailed basis should be adopted in this country. The only recommendation we would make is that the maximum compensation should not exceed 10 times the present income, except when the present income does not provide a resasonable basis having regard to the value of the property and expectations of income therefrom. In such cases, present income for the purposes of capitalisation must be fixed *ad hoc* on merits. For the rest, a more detailed study than we have found it possible to undertake is necessary.

We shall close this matter by re-producing, for ready reference, the relevant provisions of the U. K. Coal Act of 1938 :

> " *Section 6* (3). The aggregate amount of the compensation payable in respect of all principle coal hereditaments shall be the sum of sixty-six million, four hundred and fifty thousand pounds.
>
> " *Section* (4). The Central Valuation Board established under the Third Schedule to this Act shall prepare and deposit with the Board of Trade a map showing a division of the whole of Great Britain into regions (in this Act referred to as ' valuation region'), and shall allocate to each valuation region a part (in this Act referred to as a 'regional allocation') of the said sum of sixty-six million four hundred and fifty thousand pounds, being a part bearing the same proportion to the whole of that sum as they may estimate the value of all principal coal hereditaments in the region to bear to the value of all principle coal hereditaments in Great Britain.
>
> *** *** ***
>
> " *Section 7* (*4*). The value of a holding shall be taken to be the amount which the holding might have been expected to realise if this Act had not been passed and the holding had been sold on the valuation date in the open market by the existing owners thereof, selling as willing vendors to a willing purchaser, under a contract providing for completion thereof on the vesting date, so however that, where a right to withdraw support is to vest in the Commission with coal or a mine of coal in which a holding subsisted, it shall be valued as if each of the existing owners there of, having power to grant that right to the purchaser for an interest corresponding to the existing owner's interest in the coal or mine, had agreed so to grant it in addition to any acquired rights in which the holding subsisted.

" (5) The said amount shall be ascertained, subject to the provisions of the Third Schedule to this Act, by the Regional Valuation Board established under the Third Schedule to this Act, and where the premises in which a holding subsisted include subsidiary coal hereditaments, the Regional Valuation Board shall also ascertain the parts of that amount that are attributable to principle and to subsidiary coal hereditaments respectively.

" (6) The Regional Valuation Board shall certify to the Commission the amounts ascertained by them under the preceding sub-section in respect of each holding in their region for which compensation is payable, indicating which of these amounts are amounts attributable to principal and to subsidiary coal hereditaments respectively.

" (7) There shall be paid in respect of each holding in any valuation region for which compensation is payable

(*a*) a sum bearing to the amount certified in respect thereof as attributable to principal coal hereditaments the same proportion as the amount of the regional allocation for that valuation region bears to the aggregate of the amounts so certified in respect of all such holdings in that valuation region. "

It should be observed that the total compensation to be apportioned amongst royalty receivers was fixed in advance in the Act at £ 66,450,000. The similar figure for India would, on the basis of our earlier recommendations, be a maximum of Rs. 6½ crores for Bengal and Bihar.

There is one point we would, however, clear up. Capitalisation should be of the present income—and for this purpose the year 1945 should, we think, be taken—and not the average income over the past few years or, except in the special cases we have mentioned, likely future income. The earlier years saw considerable fluctuations in coal raisings, for reasons of an extraordinary nature and it would be inequitable to base our calculations on the average for those years. To take into account the actual income in a future year is equally dangerous as this may lead to speculation. In all the circumstances, the 1945 income is the fairest basis ; despatches in that year were much above the average for the previous 5 or 6 years. To that extent the royalty income accrued in the year affords a fair deal to those whose interests are being bought out ; on the other hand, so far as Government are concerned, the 1945 income is not unfair, for it is unlikely that there will be any retrogression in the coal industry.

12. The total compensation payable under the foregoing proposals should not exceed Rs. 6½ crores ; for known and unworked areas, we think nominal compensation only, say Rs. 15 or Rs. 20 per *bigha*, which is the rate of *salami* now being levied, may be suitable. Messrs. Nag and Krishnan assumed that the income to the State from royalties would be approximately the present income of the royalty receivers. But we think it will be appreciably higher as we have indicated elsewhere the need for expansion in India's coal industry ; to the extent that this expansion takes place in the Permanently Settled areas of Bengal and Bihar—there are large tracts awaiting development and we think that Bengal/Bihar should produce about 32 million tons of coal eventually—will the income of the State from royalties increase. Financially, therefore, the acquisition of mineral rights should not prove an unattractive proposition.

Under present circumstances, acquisition has necessarily to be undertaken and financed by the Governments of Bengal and Bihar. In evidence before us, the representatives of the Bengal Governments stated that their Government had not reached final conclusions on the recommendations of the Land Revenue Commission, though the vesting in the State of undiscovered coal was contemplated. The written reply of the Bihar Government said that they did not consider the acquisition of mineral rights practicable so long as the Permanent Settlement remained in force. We hope that our views on this question will help both governments in arriving at reasoned conclusions. Approximately 1/3rd of the compensation estimated by will be payable in Bengal and the balance in Bihar.

Procedure for Acquisition

13. It remains to deal with the procedure and the machinery for acquistion. In the United Kingdom, the work of acquisition was entrusted to a Coal Commission and the Legislative device adopted for transferring title is given in the following extract from the Coal Act of 1938 :

> " *Section 3* (2) During the period between the first day of January nineteen hundred and thirty-nine (in this Act referred to as the ' valuation date ') and the first day of July nineteen hundred and forty-two (in this Act referred to as the 'vesting date ') all coal and mines of coal shall be held as if all the existing owners thereof had, in respect of all their interests therein other than retained interests and with full capacity so to do, entered into a contract on the valuation date for the sale thereof to the Commission, at a price to be ascertained by valuation withprovision for completion of the contract on the vesting date.
>
> " (3) On the vesting date all coal and mines of coal as existing at that date shall vest in the Commission for a title comprising all interests then subsisting in any such coal or mine other than retained interests. "

Interests in coal or a mine of coal that arise under a coal-mining lease were retained interests not proposed to be acquired, except that—

> " (*a*) Interests arising under a coal-mining lease in coal or a mine of coal which is sub-demised by a coal-mining lease derived out of that lease, or which is, by virtue of any other form of disposition taking effect directly or indirectly out of that lease, held in like manner as if it had been so sub-demised ; and
>
> (*b*) interests arising under a coal-mining lease where neither the lessee nor any person claiming under him is a person carrying on the business of coal-mining and having a substantial beneficial interest in the exercise of the rights conferred by the lease ;

shall not normally be considered as retained interests. The result of this is to extinguish the interests of an intermediary holder of mineral rights in addition to those of the original holder.

What was done in the United Kingdom provides an excellent precedent for us and we recommend that it be adopted ; the procedure has the great merit of simplicity. The interval between the " valuation date " and the " vesting date ", as defined in the United Kingdom Act, need not, in our opinion, be more than 2 or 3 years in India.

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1 Section 5(2), Coal Act, 1938.

Though the acquisition of mineral rights is the concern of the two Provincial Governments, we think it will be administratively sounder for the Provinces to delegate this duty to the body we propose later for the discharge of certain other functions. The need for uniformity of action and principles in the two provinces is unquestionable and this can best be secured by entrusting the task to one body.

Conclusions And Recommendations.

(1) The private ownership of mineral rights in the Permanently Settled areas of Bengal andBihar has been responsible for a number of harmful consequences which cannot be removed so long as the present position contiues.

(2) **The only solution is State acquisition of mineral rights, and we recommend it.** This is postulated also by the possibility of nationalisation of the coal industry in the years to come.

(3) **The State should by legislation vest in itself rights to coal at depths below 2500 and in all areas in which coal has not so far been discovered. No compensation should be payable in such cases.**

(4) **The compensation for areas in which coal exists but is unworked should be nominal.**

(5) **Compensation for areas in which coal is being worked should not exceed 10 times the royalty income in 1945.**

(6) Royalty payments in 1945 probably did not exceed Rs. 65 lakhs **and we suggest that the total compensation payable for the acquisition of mineral rights should not exceed Rs. 6½ crores.**

(7) **The procedure for acquisition might be similar to that adopted in the United Kingdom Coal Act. 1938.**

(8) **We think it would be convenient and desirable to entrust the task of acquisition to the Central organisation we propose later.**

CHAPTER XV

LABOUR, MECHANISATION AND THE CONTRACTOR SYSTEM

Labour and mechanisation have perhaps a more important bearing on the fulfilment of our production plans than any of the other factors mentioned, with the possible exception of prices. These other factors react in a more or less indirect way but it is the labour and the machines that cut and raise the coal and no advance is possible unless both are organised to play their vital role in the industry.

Labour.

2. There have been chronic labour difficulties in the Indian coal mining industry. As long ago as 1919, Mr. Treharne Rees observed that the labour available was inadequate and unsatisfactory. The men were untrained and the output per person was low. Moreover, the majority of the workers were primarily agriculturists who treated mining as a secondary occupation ; the supply of labour therefore fluctuated with the time of the year. The need for attracting more labour to the coalfields and for securing a settled mining force was self-evident, and these objects could probably be secured by prescribing regular shifts of work, providing better living accommodation and offering further inducements by way of small plots of land in the vicinity for cultivation and transport facilities to and from the mines. Commenting on these suggestions, the Coalfields' Committee, 1920 stated that there was no combination among the coal companies for the purpose of recruiting labour and no recognised colliery recruiting agencies existed. Each company employed a more or less desultory method and no system has been devised for preventing desertions from one colliery to another. So long as these methods continued Government could not give effectual aid to the industry in the matter of labour recruitment. The Committee did not agree either that there should be a prohibition in certain districts on the recruitment of labour for industries other than coal and especially for the tea industry ; for, coal mining at its best, and however highly it is paid, was subject to certain disadvantages from the point of view of labour and it was for the coal indsutry to remove them and gradually convert into a skilled mining community the population which was once wholly, and was still partly, agricultural. On other points the Committee thought that the time had not arrived for statutory interference in the hours of work ; better living accommodation was certainly important, and provincial Governments should assist the mine-owners in overcoming difficulties in acquiring surface rights for colliery purposes. Mr. Treharne Rees' suggestions as to certain further inducements would not, in the opinion of the Committee, materially affect the position.

The Indian Coal Committee, 1925, had the following observations to make on Indian coal mining labour :

> " the labourer in the Indian coal fields is primarily an agriculturist and, considered as a coal-miner, is merely a casual and unskilled worker, and his standard of comfort is so low that the only effect of an increase in wages is a decrease in output, as he can obtain the amount which he needs by working fewer days in a week. "

The Coal Mining Committee, 1937, which dealt with the problem of labour only briefly were impressed by the need for improving educational facilities in the coalfields and suggested that the Statutory Authority proposed

by them should function as a Mining Education Board for the coal fields and obtain the necessary funds partly from Government, partly from the local authorities, and partly from the proceeds of the stowing cess. On a minor point, the Committee recommended that the question of applying the Payment of Wages Act (which contains provisions for imposing fines on workers) to coal mines should be considered ; and there might be need in this case for levying heavier fines than are permissible under the Act.

3. Regular shifts, and limited hours of work have since been prescribed but barring isolated attempts by a few mine-owners little else was done until very recently to obtain a contented and settled abour force for the coal mines. Over much of the industry, the conditions of labour are still in a shocking state ; living accommodation is inadequate and deplorable; educational and medical facilities are scant ; and few amenities exist to relieve the strain and tedium of work underground. The mine worker remains attached to his land partly for sentimental reasons and possibly also because of the conditions inherent in coal mining and he is far from being the industrial worker that is needed. He still leaves his mining occupation at certain seasons of the year and, while he remains in the coalfields, he works only for the satisfaction of the bare necessities of life. In consequence, and because little is done to train him for his vocation, his average annual output remains they lowest in the world. Lastly, when agriculture does not beckon, there is an increasing tendency to find more congenial and possibly more remunerative forms of employment. The result, on the whole, is that the labour force available to the coal industry is inadequate and unsatisfactory. Even at the present level of production labour is proving to be a serious retarding influence ; and, unless the situation improves, there is little hope of increasing production to the high level we have in view. Attention must, therefore, be directed towards devising ways and means for improving the present situation; the objectives being an adequate, settled and contented labour force and a satisfactory degree of efficiency in the miner. We have been asked not to deal with labour problems, but the attainment of these objectives is so vital to the fulfilment of our future plan of production that we had perforce to devote some attention to them, though in general way only.

4. We shall first briefly refer to the existing labour position in the industry. Some of the detail that follows is culled from the report of the *ad hoc* survey of labour conditions undertaken by the Labour Department, Government of India, and from a note furnished to us by that Department. As complete details are not available for the Indian States, we are confining our review to the position in British India only and more particularly to the situation in Bengal and Bihar, which so completely dominate the Indian coal industry.

According to " Indian Coal Statistics ", in 1939 the number of persons employed in the industry in British India was 201,989 including 23,004 women on the surface and in open workings. The bulk of the labour was working in Bihar and Bengal with 118,200 and 57,882 respectively. By 1944 according to the Labour Department, the labour force had increased to 247,073, including 19,865 women underground and 41,562 women on the surface and in open workings ; the shares of Bihar and Bengal of the total labour forces were 154,844 and 64,491. But it may be stated that the ban on the employment of women underground, lifted temporarily as a war emergency, has since been re-imposed.

The increase in labour in 1944 of just over 45,000 is mainly due to the larger number of women working; in addition to those underground, there were over 18,500 more women on the surface and in open workings. The number of men working on the surface and in open workings also rose, apparently because of the opening of numerous small undertakings working quarry coal in the boom years of the war. Employment underground increased by less than 1,500 and the number of men so employed actually fell by over 18,500. It must be explained, too, that a portion of the labour force in 1944 represented Gorakhpur labour specially recruited by the Central Government. If they and the women underground are excluded, the labour working in 1944 would be only 10 to 12 thousand over the 1939 figure.

In the following table, we compare the labour force employed with output in the two years:

	No. employed		*Output (in million tons)*	
	1939	1944	1939	1944
British India	201,989	247,073	24·68	23·49
Bihar	118,200	154,844	14·79	14·36
Bengal	57,882	64,491	7·59	6·79

The labour figure for 1944 is probably an over-estimate for reasons explained later but nevertheless it is apparent that an increased labour force did not bring about an increase in output; there was on the contrary a decline. The explanation probably lies in the increase in absenteeism with rising wages etc. which more than offset the slight increase in underground employment.

5. Much has been said about the migratory nature of coal mining labour but migratory is perhaps an incorrect word to use in this connection; for the labourer does not so much change his abode permanently as return to the land for short periods during the year. It has been estimated that 30 to 40% of the workers so return in June-July and 25 to 50% in October-December. For the Bengal Bihar fields, the percentages of labour permanently settled in the coal mining industry are stated to be as follows:

Jharia	25 to 45%
Raniganj	30 to 50%
Bokaro	40 to 75%
Giridih	70%

According to a recent survey, a miner is absent for about 57 days in the year on these visits. In addition, while resident in the coalfields, he works on an average, for only 4½ days in the week; so that his working days in the year are about 190 only. This considerable absenteeism is one of the principal causes of the low average annual output of Indian mining labour; others are the miners, failure to work the full shift, his lack of suitable training and the comparatively primitive way in which the co l is cut and raised in India in many small mines.

6. Complaints about the inadequacy of miners have persisted over many years, and we have, therefore, thought it worthwhile to reproduce below figures of average daily attendance in the industry in British India for some recent years :

Year	*No. employed*
1933	144,764
1936	162,993
1938	201,212
1939	201,989
1940	209,331
1941	218,280
1942	215,298
1943	..
1944	247,073

The figures for 1943 and 1945 are not available. We are informed that the figures for the later war years may be over-estimates given deliberately by collieries in order to obtain larger grain and other foodstuffs allotments. This is probably true but we should also bear in mind that, in any case, the bulk of this labour worked on the surface. There was an undoubted shortage of trained underground workers, as many of them had found more congenial and remunerative employment on military and other works. These facts must be taken into account in computing the *per capita* output of Indian coal-mining labour during the later war years. But it does not detract from the fact that from 1933 to 1941 there was more than a 50 % increase in labour attendance and that output also rose in about the same proportion.

7. The foregoing paragraphs should provide a sufficient background for the further consideration of this question. The points that emerge are that absenteeism is very large and that average output is low. Absenteeism is related to the miners, periodical visits to his village and his refusal to work a full week. In looking for an improvement, we would first enumerate the reasons for this absenteeism. They seem to be as follows :

(*i*) unattractive working and living conditions ;
(*ii*) natural disinclination to work underground ;
(*iii*) a sentimental attachment to land, and, more latterly, the higher profits of agriculture ;
(*iv*) lack of physical stamina ;
(*v*) the miner's wants are few and are satisfied by the earnings of a few day's work only in a week ; the desire for larger earnings cannot arise when he does not know how to spend his money.

If the coal industry is to be provided with a settled and contented labour force, it will be necessary to ensure that :

(*a*) working conditions are conducive to the health and comfort of the worker,
(*b*) adequate housing accommodation, good food, water and other amenities are available,
(*c*) opportunities for recreation are provided,
(*d*) social services such as medical aid and assistance during periods of sickness are offered on an adequate scale,
(*e*) an adequate and attractive wage is offered, and

(*f*) due attention is paid to the education of the miner, so that the desire for a better standard of living is created.

Of these, we shall deal with wages in a later chapter. We believe that these steps will go a long way to transform the present labour force into a settled mining community. Moreover, fulfilment of these conditions is essential if labour from other sources is to be attracted to coal mining. In war-time the employment of Gorakhpuri labour has demonstrated that other than the traditional types of labour can take to coal mining; the movement must be encouraged, though not at the expense of the traditional coal-mining labour.

8. We are glad to note that both Government and the industry are alive to the need for prompt and far-reaching action. Amongst the measures contemplated for improving conditions, the following have been mentioned by the Labour Department, Government of India:

(*i*) modification of the Mines Act and adequate enforcement of its provisions;

(*ii*) a reduction of hours of work from 54 to 45 underground and from 60 to 48 above ground;

(*iii*) a scheme of compulsory accident insurance;

(*iv*) provision of holidays with pay; and

(*v*) introduction of a cash benefit during periods of sickness.

On the welfare side, a fund has already been created and is proposed to be utilised for:

(a) the improvement of public health and sanitation, the prevention of disease and provision of medical facilities and the improvement of existing supplies and facilities,

(*b*) the provision of water supplies and facilities for washing and the improvement of existing supplies and facilities,

(*c*) the provision or improvement of educational facilities,

(d) the improvement of the standard of living including housing and nutrition and the amelioration of social conditions and the provision of recreation facilities.

The annual income of the fund is about Rs. 55 lakhs and it is administered in consultation with an Advisory Board representative of colliery owners, workers, and the Governments of Bihar, Bengal and Central Provinces.

We have, in this connection seen the memorandum on the activities of the Coal Mines Labour Welfare Fund issued by the Department of Labour, Government of India, in 1946. We find that it is proposed to expend the monies in the fund on objects such as malaria control, hospitalisation, improvement of water supply, improvements of housing, pit-head baths, adult education and other minor objects. It appears, too, that since the income of between Rs. 50 to 60 lakhs a year was considered insufficient to enable action on sundry welfare measures to be taken all at once, an order of priority of work has been decided upon as follows:

(*i*) public health and medical arrangements,

(*ii*) water supply,

(*iii*) improvement in housing conditions, and

(*iv*) adult education.

In the budget proposals for 1946-47, the following items of expenditure have been provided for:

	lakhs
Construction of hospitals	11
Construction of Child Welfare Centres	7½
Provision of office and residential accommodation for the Fund	6
Initial provision for housing estates	10
Provision for adult education	3
Grant to the Jharia Water Board	5
Subsidy for Pithead baths	2
Recurring expenditure for anti-malaria work	13
Expenditure on vegetable farms	Rs. 80,000
Provision of office and residential accommodation for anti-malaria units in all fields	Rs. 17 lakhs.

The expenditure proposed for public health and medical arrangements accounts for nearly half the total expenditure in the year and, in particular, the expenditure on anti-malaria work is Rs. 30 lakhs. We are not convinced that the proper way to proceed in this matter is to work to any order of priority between various schemes. All the measures mentioned are important and we think that work on them should proceed simultaneously. We cannot help commenting on the very large provision made for anti-malaria work and the comparative slowness with which the task of providing adequate housing accommodation is being proceeded with. One of the most important means of securing a settled and contented mining force for the coalfields is the provision of suitable housing and amenities. For this, as well as for facilitating the provision of adequate sanitary and medical arrangements, centralised townships offer an excellent medium. If, therefore, any order of priority is necessary at all, we think that the construction of townships and the provision of adequate water supply and other amenities should receive first attention.

If the proceeds of the Labour Welfare Cess prove insufficient to implement schemes of labour welfare on the scale and with the speed that are undoubtedly needed, there should be no hesitation in raising larger funds.

We think the provision of adequate educational facilities is of considerable importance. The evidence tendered before us is clear on the paucity of existing facilities and the need for vastly increased ones. Only through education can the miners and their children be made to appreciate the need for and the benefits of a better standard of living; if through improved wages and better opportunities that higher standard of living can be brought within reach, a most important result would have been achieved. We do not attach importance to the suggestion made in some quarters that education may actually result in weaning the worker away from coal mining; for if coal mining is made attractive to labour, we do not see how real harm can be caused.

9. We think it will be of interest if, at this stage, we reproduce extracts from a recent memorandum of the Government of India on the setting up of an Industrial Committee on Coal Mining:—

> "The International Industrial Committee on Coal Mining which met in December 1945 in London and was attended by a Tripartite Delegation from India, has drawn attention to the factors which in the past have promoted instability in the Coal Mining Industry, *viz.*, uncertainty of markets, physical dangers to the workers and extremely arduous circumstances all too frequently

attending the mining of coal ' and has emphasised the need for the adoption of ' a Statement of Principles in relation to the status of coal mine workers in order to mainain stability of employment in the industry the social welfare and dignity of those devoting their lives to coal production and the constant introduction of a sufficient number of young persons to ensure the future of the industry.' These aims are naturally ' fundamentally dependenton the maintenance of a high standard of production on the part of all concerned in the Industry'. The main items of the Statement of Principles suggested by the Committee are :—

opportunity for steady employment in the Coal Mining Industry to be assisted through stabilisation of production and use of coal and the development of alternative uses of the products of coal mines ;

2. (a) wages at rates which will support an income attractive as compared with income in industry generally, so as to provide adequate man-power and improve the standards of living ;

(*b*) provision for adequate annual holidays with pay ;

3. working time in the mines effectively less than the working time in Industry generally ;

4. work under conditions conducive to safety, health and comfort of the workers and an adequate scheme for the prevention of accidents and of workmen's compensation ;

5. social betterment in the interests of coal mine workers and their families ;

6. scheme to provide adequate retiring allowances to make provision for the old age of those who have been employed in the Coal Mining Industry ;

7. training courses for new entrants ; and

8. co-operation among the interests involved in the success of the Industry including collective bargaining.

" The Committee has also expressed the hope that, while taking the situation in their respective countries into account, Governments will strive to give effect as soon as possible to the reforms recommended by it.

" The eight-point programme outlined above constitutes a necessary and desirable objective of public policy in relation to the Coal Mining Industry in this country as much as in other principal coal producing countries.

" Legislative and administrative action in regard to items 1 and 7 are primarily within the sphere of the Central Government Department in charge of coal, namely, the Industries and Supplies Department at the movement (and later the Department of Works, Mines and Power when it takes over the responsibility for coal), while items 2, 3, 4 and 6 are the concern of the Labour Department. Item 5 lies largely within the sphere of the Provincial Governments. The Governments of certain Indian States are concerned with all the items in respect of the coalfields and mining population within their territorial jurisdiction.

"The subjects are all inter-connected. The implementation of the eight-point charter will necessitate full and frank discussion regarding the order of priority to be followed in implementing the programme, the nature and scope of the reforms that are considered necessary and the pace at which they are to be carried out, the discussion should not only be between the Central Government Departments concerned, but also with the Provincial and Indian State Governments, the employers and the employees.

"There is at present no machinery for joint consultation and discussion between the various parties vitally interested in or charged with responsibility for the improvement of social and working conditions in the Coal Mining Industry. *Ad hoc* Committees can be set up for the discussion of individual problems, but the Committees will lack the continuity of personnel and purpose necessary for implementing a comprehensive scheme of reforms. The Tripartite Labour Conference cannot undertake this task either. It is composed of representatives of all Provinces, many of whom will have no direct interest in the problems relating to Coal Mining Industry. The representatives of employers and employees on the Conference not being drawn from the Coal Mining Industry may lack knowledge of the specific problems of the Industry and may not be therefore in a position to tender authoritative advice to Government or reach agreements which the two parties could themselves implement without the intervention of Government. A specialised agency to study the problems affecting Coal Mining Industry is urgently required and it is proposed accordingly that an Indian Coal Mining Committee should be set up on a Tripartite basis consisting of the representatives of the Central Government Departments, the Provincial and State Governments in whose areas the coalfields lie and of the Employers and the Employees. This Committee will be quite distinct from the Coal Mines Labour Welfare Fund Advisory Committee, but the two will work in close co-operation with each other."

10. We have referred to the need for increasing the output of labour. Partly, this will come about naturally as a consequence of improved working and living conditions. But we think consideration should also be given to the proper training of the worker in the technique of mining ; the importance of such training increases with the need for greater mechanisation of the mines as one of the surest means of increasing total and *per capita* output.

11. One other point we shall deal with. During the war, the Government of India, at considerable expense, arranged for several thousands of Gorakhpuris to be placed in the coalfields. This was necessitated by the war emergency and succeeded in achieving the limited objective, namely, increased production. But there still remains the question as to whether Government should, in peace time, assist in building up a suitable labour force for the coal industry. As regards this, we are attracted by a suggestion made to us that a suitable Government-sponsored organisation with labour exchanges in the main recruiting and coalfields' areas should be set up. This may also prevent the indiscriminate drift of labour from colliery to colliery.

Mechanisation.

12. The much higher *per capita* output of coal in countries such as the United Kingdom and the United States of America is undoubtedly due to the greater degree of mechanisation reached. Mechanisation includes both the machine cutting of coal and its conveyance to the pit-bottom by mechanical means. The two should normally go together. In India, mechanisation, in this sense, is still in its infancy, but a certain number of mechanical coal cutters are in use. The conveyance of coal is, however, still largely dependent on the hand-loading of tubs.

In the following table, we give the number of machines that have been in use in India in the last few years and the quantities of coal cut by them:

Year	No. of machines	Quantity of coal cut (tons or sq. ft. under-cut)
1935	95	6·63 million sq. ft.
1936	110	5·36 „ „
1937	140	6·89 „ „
1938	186	8·83 „ „
1939	203	10·82 „ „
1940	205	2·88 million tons
1941	187	2·51 „ „
1942	197	2·04 „ „
1943	192	1·99 „ „
1944	210	2·10 „ „

During our consideration of this question, it has emerged that machine cutting has not proved entirely satisfactory in India for the following reasons: —

(*i*) there is a paucity of men trained in the handling of mechanical coal cutters;

(*ii*) large outputs with machines can be attained only if loading and transport facilities are adequate to cope with the coal got; in India rail transport has been short at certain times of the year and it has not been possible to use the machines to their full capacity; and

(*iii*) arising out of (*ii*) and because labour at times is both plentiful and comparatively cheap, machines do not always prove an economical proposition.

On the third point, the Tata Iron and Steel Co. have stated as follows:

> "Mechanical coal cutters increase the production from the mines by 100% but the mining cost based on the actual number of miners and loaders employed is higher than for pick mining. If the costs are spread over all the operatives, the increased production brings down the average cost of coal loaded into wagons."

The same point, namely, that while the cost of coal into tubs is higher, over-all colliery cost is less has been made by a number of other witnesses also. But there is a further limitation even the over-all cost may be higher if the expensive machines are only partially used, as has been inevitable in many places in India.

13. That machine mining will have to be extended if labour difficulties in the coal industry persist seems obvious. But there is general agreement with the view that save in virgin areas or collieries, the potentialities of machine cutting are limited in this country, because conditions in mines in which pillars have already been formed are not usually suitable for machine cutting. We should, however, like to make two observations :

(*a*) mechanisation may provide the only real means of securing quickly the very large increase in output that is necessary in the future years ;

(*b*) the present slightly unfavourable attitude towards machines is probably the result partly of the availability of cheap labour ; when labour costs increase, as they inevitably must, the economic bias in favour of pick mining may disappear and the matter may become capable of decision on the merits of what is needed.

We think, therefore, that all new development must be directed with the object of bringing about the maximum possible use of mechanisation for coal cutting and conveying. We are informed that this would necessitate the adoption of new methods of development if the machines are to be put to the best use, and the need for technical guidance and adequately trained labour must be recognised. In present circumstances, Government as the authority which, in our opinion, is charged with the duty of fostering sound development, must take the initiative in these matters.

There are two limiting factors which must be removed if machines are to play their proper role in the industry. They depend entirely on electricity, and adequate power facilities must, therefore, be provided. Further, rail transport which, in the past, has acted as a brake on maximum utilisation of installed machines, must be improved; and since mechanical coal cutting will have to be adopted on a large scale in new areas, railway facilities in such areas must be carefully planned.

The Contractor System

14. A notable feature of the coal industry in India is that it utilises the services of a series of middlemen, called contractors, principally for recruiting labour but frequently also for raising the coal. There are the following types of contractors :—

(*a*) Raising contractors, who recruit the labour and supervise their work about a mine. Their function is to get the coal cut and loaded into wagons at an agreed rate.

(*b*) Commission contractors, who recruit the labour and are paid a commission on the coal raised by their labour.

(*c*) Managing contractors, who provide the labour and raise coal for a company at a rate per ton despatched. They bear the whole cost of recruitment, coal raising and administration, but this type is now gradually disappearing from the Jharia and Raniganj fields.

We are informed that commission contractors virtually serve as recruiting agencies for colliery labour and thus perform a useful service. As they do not play any further role in coal raising, it is not necessary to deal with their case further ; and for the other reason mentioned above, we dismiss managing contractors with the remark that they probably represent a worse form of organisation than raising contractors.

15. The report of the *ad hoc* survey of conditions in the coalfields under taken by the Labour Department, Government of India, observes that" there is no uniformity in regard to the terms and conditions of the contract work of the raising contractor, although in almost all cases the machinery and the haulage are provided by the mine owner. In some cases, some of the administrative expenses such as the pay of Khalasis, engine drivers, etc., are payable by the contractor, while in others the contractor has to bear no other expenses except the wages of the labour for cutting and carriage of coal up to the wagon point". We would draw particular attention to the fact that the wages of labour are paid by the contractor.

In years past, a large proportion of the coal raised was obtained through the agency of raising contractors ; in 1929-30, the percentage was 70 in the Jharia field and 40 in the Raniganj field. But there has been a decline in their number and influence, so that in 1944 only 60 raising contractors were being employed by 49 mines in Jharia and Raniganj and accounted for only a quarter of the production of the two fields ; it is understood that the number has fallen further since.

The largest employers of raising contractors are the railway collieries in the Bokaro and Giridih fields, where the services of 11 contractors responsible for nearly 30,000 workers are utilised. One reason for the adoption of this system in the railway collieries is stated to be the difficulties arising from the rules and regulations surrounding direct employment by the State.

16. We first considered whether the contractor system tends to bring about the adoption of unsystematic mining methods. The evidence before us is that there is no inherent connection between the two ; the degree of systematic working is dependent on the supervision provided by the management of the colliery. One witness has stated, though presumably in defence of the contractor system, that on account of the heavy and increasing responsibilities placed on the technical staff for safety, " they have not the time to attend to actual production. The coal raising contractor leaves the technical staff more freedom for the technical supervision and safety of the mine." The answer is obviously more technical men about a mine and not less supervision.

17. The Royal Commission on Labour in India made the following comments on the system of raising contractors :

> " Both in law and in fact the manager is responsible for the safety of the workmen ; he determines where coal shall be worked and his decisions have the closest effect on the security of the miner, but even the safety-men are not the manager's subordinates being selected and paid by the contractor. The law also holds the manager responsible for compliance with its provisions in respect of hours of work, holidays, the employment of women, etc. As a rule, he has also responsibility for housing and other matter, (*e. g.*, water supply) affecting the welfare of the worker outside the mine. Yet he has ordinarily no responsibility for the selection of the workers, the distribution of their work, the payment of their wages or even the numbers employed. We believe that, whatever the merits of the system in primitive times, it is now desirable, if the management is to discharge completely the complex responsibilities laid upon it by the law and by equity, that the manager should have full control over the selection, hours of work and payment of the workers. On all grounds, we recommend the gradual supersession of the raising contractor as such and the substitution of what is known as *sarkari* working. "

No doubt, in certain respects, the position has improved since the Royal Commission reported. The Bihar Labour Enquiry Committee also recommended the elimination of the contractor system. But the railway collieries would seem to favour its retention because they consider that formidable difficulties would arise in the direct administration of so large a labour force. They also fear that under a system of direct employment and payment by the State, development work and raisings would drop as has happened on occasions in the past. There is stated to be a further difficulty: the output of the railway collieries has been subject to fluctuations during certain times of the year and it would be wasteful to maintain a steady labour force under such circumstances. Under the raising contractor system, the responsibility, financial and otherwise, for producing all the labour required is the contractor's. On the other hand, this difficulty can be over come by stabilising the output of the collieries, as we have recommended elsewhere.

18. On the other hand, certain serious defects in the system of raising contractors have been pointed out to us. Though the colliery administrations are technically responsible for controlling the conditions of work and the wages of labour, the control, in actual fact, is said to be generally ineffective. There is no sure means of ensuring that labour is paid a reasonable wage in accordance with the contract which stipulates that the contractor shall make payment at rates not below those which are prevalent for labourers employed at the colliery for similar work. Muster rolls and pay registers are maintained by the contractors in a diversity of ways and there is much confusion.

The evidence tendered before us confirms that the contractor system is a hindrance to the establishment of proper relations between labour and the management. In addition, the report of the Labour Department's *ad hoc* survey states that "contract labour is definitely more expensive than *sarkari* labour when the mine is efficiently managed"—a statement which is, however, contested by the Railway Colliery Administration. Labour is also reported to be more contented under the *sarkari* system. The same report adds that labour is driven to work over-time "often without additional remuneration and in flagrant violation of labour laws in existence". In all circumstances, we would like to see an early abandonment of the system, but care must be taken to guard against the possible danger of the drift of labour away from the mines.

Conclusions and Recommendations.

(1) The main characteristics of Indian coal-mining labour are that absenteeism is large and average output low.

(2)There is urgent need for providing the industry with a settled mining force; and this can probably be secured by improving working and living conditions and providing a better wage and adequate amenities.

(3) For increasing the output of labour, training facilities for miners should be provided.

(4) A Government-sponsored organisation with Labour Exchanges in the main recruiting and coalfields' areas may be of help in recruitment and prevention of drift.

(5) Potentialities of machine cutting in older mines are limited but we think that **new development should be directed with the object of bringing about maximum possible mechanisation .**

(6) The raising contractor system should be abondoned as early as possible.

CHAPTER XVI

CAPTIVE COLLIERIES

The emergence Of Captive Collieries

The phrase "captive collieries" is an apt and picturesque description of those units of production which operate in the interests of certain consumers of coal, who own and manage the mines. We have already briefly referred to the importance of captive collieries. The tendency towards this form of vertical integration between industry and industry is really a bye-product of the capitalistic system which pioneered and fostered industrialisation in the west. When supply and demand operate in an unregulated economy based on capitalism and private enterprise, it is only natural that the gap between production and consumption should create confusion until one overtakes the other and continues to go forward and brings about yet another cycle of disequilibruim. It was natural, therefore, for large consumer interests to devise for safeguarding the supply of the raw materials they need.

2. The schemes and arrangements of vertical integration vary considerably from one country to another. In the United Kingdom, captive Collieries do not occupy a prominent place, but there are several well-known mines which are owned by or form a financial entity with iron and steel works, as for example, the colliery interests of such coal and iron groups as Ebbe Vale, Staveley, Richard Thomas, Lancashire Steel, Dorman Long, etc. Certain collieries in South Wales are interlocked financially with chemical undertakings. In pre-war Germany the tendency towards vertical integration reached its highest level. Over 55 per cent. of the coal mined in the Ruhr was raised by collieries which were owned by iron and steel enterprises. From 8 to 9 per cent, of the output was contributed by collieries owned by the State and which, therefore, may be regarded as serving public utilities such as the railways, arsenals, ship-yards, etc. In France also the vertical integration of coal mining was far advanced. The great bulk of mining properties in France belonged to collieries which were tied in with communities of financial interests or with metallurigical, chemical and electricity supply works. In the United States of America this form of organisation is less develped but about 25 per cent. of the total output of coal is raised by captive mines or by mixed captive and commercial mines.

India's coal inudstry exhibits similar tendencies developed during the last 30 years. The principal combinations have been with the railways, the iron and steel works and shipping interests. The cement industry has also begun to acquire coal properties.

3. On the point whether consumer interests should be permitted to own and operate their own properties we do not see any inherent objection. In point of fact, however, each case must be treated on merits. Take, for instance, the position of the iron and steel industry in India. There are only two large production units both of which have acquired substantial coal properties. Our reserves of good quality coking coal are very limited. It has been represented to us that if the two rion and steel companies were to make themselves not only completely self-sufficient in their coal requirements but were to adopt a policy of owning most of the coking coal mines, they would be in a position to prevent the establishment of another independent iron and steel works in the country. This would obviously be an anti-social movement and national interests cannot

possibly permit such a development. If the railways, a public utility of great importance, are to become entirely independent of the commercial market and produce their own coal; they would have to raise nearly ⅓rd of the present total output of coal in the country. This contraction of the market may not be a healthy tendency. The Railway Board have told us that while they are not opposed to any proposal which would make them independent in the matter of production and supply of coal, they are more concerned that there should be maintained certain units of production as an emergency reserve against interruptions in coal supply. We must not, however, lose sight of the principal features of large integrations of a vertical nature, namely, the development of monopolies and cartels. While we recognise that important industries like the railways and the steel works are fully entitled to adopt measures which would ensure regular supplies of coal for their requirements under the circumstances prevailing in India, we cannot agree to any such consumer interests owning coal properties unduly large, in proportion to their requirements.

Railway Collieries

4. At present the Indian Government railways own the 11 Collieries tabulated below:

Colliery	Capital (advanced by Government) up to 31-3-1946	Name of seam	Quality	Characteristic	Present working practices	Output 1945-46 (Tons)	Workable reserves of coal (Tons)
	Rs.						
Kargali	59,97,644	12-Foot	Grade I	Coking	Shaft, Incline &	799,768	3,200,000
		Kargali	Grade I	,,	Quarry		40,000,000
		Bermo	Grade II	,,			40,000,000
Bokaro	25,88,229	Kargali	Grade I	,,	Quarries	1,159,570	40,000,000
		Bermo	Grade II	,,			42,000,000
Sawang	16,32,974	Kargali	Grade I	,,	Inclines & Quarries	63,234	50,000,000
Kurhurbaree	33,36,938	Kurhurbaree	Sel. "A"	,,			5,800,000
		Bhadua	Grade I	,,	Shafts & Inclines	309,695	3,300,000
		Upper Seam	Grade II	,,			3,200,000
Serampore	29,44,204	Kurhurbaree	Sel. "A"	,,	Shafts & Inclines	291,460	1,330,000
		Upper Seam	Grade II	,,			3,750,000
Jarangdih	78,24,199	Jarangdih	Grade I	,,	Inclines	58,369	1,400,000
		5-Ft., 7-Ft., 8-Ft.	Grade I	,,			29,000,000
		Kargali	Grade I	,,			180,000,000
Kurasia	13,57,152	No. 1 seam	Sel. "B"	Non-Coking	Adits	350,878	5,400,000
		No. 2 seam	Sel. "B"	,,			12,000,000
		No. 3 seam	Sel. "B"	,,			20,600,000
		No. 4 seam	Sel. "B"	,,			8,000,000
Talcher	45,92,383	18-Ft.	Sel. "B"	,,	Shafts	194,505	25,300,000
		Upper seam	Grade I	,,			13,400,000
Deulbera	18,48,348	13-Ft.	Sel. "B"	,,	Shafts	79,076	15,000,000
		6-Ft.	Grade I	,,			7,000,000
Argada	25,30,781	Argada	Grade I	,,	Quarries	154,220	250,000
Bhurkunda	54,46,234	Kurse	Grade I	,,	Inclines	172,404	900,000
		Nakari	Grade I	,,	Quarry.		2,400,000
		Simana	Sel. "B"	,,			4,100,000
		Sirka	Grade I	,,			18,000,000
		Argada	Grade I	,,			67,500,000
	4,00,99,086					3,633,179	

Four other collieries appear to have been acquired in the past by the railways, but these were closed down owing to technical working difficulties or on economic grounds. The Kedla mine in the Bokaro field was relinquished in the thirties at a loss of Rs. 7,36,000. Another colliery, Religara in the Karanpura coalfield, acquired in 1924, was abandoned in 1933 and the total loss suffered thereon was Rs. 20,84,000. The losses incurred on Mohpani in the Central Provinces and Khost in Baluchistan are not known. As will be seen from the statement given above, the amount of capital advanced up to the 31st of March 1945 is about Rs. 4 crores. This does not really represent true capital as understood commercially, but is culled from the annual statements presented by the Railway Board to the Railway Standing Finance Committee of the Legislative Assembly. It represents the capital advanced, less adjustments on account of capital recoveries through sale, less the sinking fund appropriations. If we were to take the value of the fixed assets and deduct ther efrom the sinking fund appropriations, the total valuation of the railway coal properties amounts to about Rs. 3½ crores at present.

The workable coal reserves of these properties are large. In the statement given above, six of the collieries are shown as producing coking coal, but there is doubt as to how far this coal is suitable for metallurgical purposes. Only the Kurhurbaree seam has been graded as Selected A; the rest are either Grade I or Grade II. The amount of workable coal reserves of the collieries producing coking coal has been computed to be about 443 million tons. Of this quantity only 7 million tons is of Selected A quality; 347 million tons is of Grade I and 89 million. tons of Grade II. The five collieries listed as producing non-coking coal have workable coal reserves of nearly 200 million tons.

5. Almost with one voice the coal producers' organisations have supported the thesis presented by the Indian Mining Association that the railways' coal purchase policy over the two decades between the two wars was principally responsible for the depressed state of the coal industry during the period. The argument runs some what like this: the railways, because of their large requirements of coal, can effectively influence the selling price of coal, and this influence has been directed towards depressing prices in the interests of the Railway budget; in their turn low prices caused over-production to reduce costs, which imposed upon the coal industry a policy of forcing sales in order to survive. The Railway Board do not admit the implication and in their opinion "the main factor leading to depression of prices was the lack of co-operation inside the coal trade itself and the cut-throat compitition between collieries which resulted at times in wagon shortage." They go on to suggest that "the remedy lies in a better organisation of the coal trade and in Government taking a broad financial outlook in times of depressions ".

We subscribe to the plea of the Railway Board that there is little to be gained by post-mortems. We do not, therefore, propose to voice any judgment over the past, but from a study of the happenings of the past we hope to be able to find a constructive solution for the fututre.

6. A convincing reason for the railways in India owning their collieries has been the violently irregular nature of supplies from market collieries against contracts. Railway requirements of coal are large and their service is of an essential character for the country. Therefore, they must, above all, be assured of regular supplies. It cannot be denied that the seasonal factor in Indian coal production has in the past seriously interferred with the regularity of supplies. For sound reasons, therefore, the railways built up their own sources of production; and it is claimed by them that they have operated their collieries in such a manner as to even out irregularities of supply which might other-

wise have seriously affected railway operation. An important carrier service like the railways must have an emergency provision of this nature. It is claimed, with some reason we agree, that, railway collieries served just such a purpose on many occasions in the past; but when it is urged that if these collieries "are allowed to be worked by any agency other than the railway administration the result would be disastrous," we are compelled to join issue.

The real point for consideration is, we think, whether the railways, who are the largest buyers of coal in India, should also be the largest producers of coal and we feel that it must be admitted that the exercise of the power arising from these two circumstances must inevitably place those who wield it in a most invidious position. In saying this, we are not implying any criticism, we are merely stating what seems to us to be a self-evident fact; and we see no difficulty in transferring the railway collieries to another Department of Government. In fact, these collieries have been under the administrative control of the Supply Department and latterly of the Industries and Supplies Department of the Government of India, and not of the Railway Board, since June 1944.

7. It has been further represented to us that the operating results of the railway collieries as shown in the annual statements, do not bear any comparison with similar results of commercial collieries. The financial accounts of Government Departments are maintained of necessity on a simple cash or accrual basis, and cannot be compared with the accounts of a commercial enterprise. Yet it must be recognised that the fact that public enterprise is not operated for profit but for public benefit does not justify its management in showing any less concern for costs than would a private enterprise. We think that, because of its public status, a State-managed organisation has an even greater obligation than a private organisation to weigh and appraise its costs as compared with the results secured. We have carefully scrutinised the Pink Books relating to railway collieries which are prepared every year for the information of the Legislature and, while we appreciate that a complete account of the operations for the year is rendered, we find that this acconnt does not in fact reveal any data by which comparisons can be made with the parallel accounts of a private company. Not only do the sinking fund and depreciation rates vary from year to year (although a firm basis is now decreed from 1st of April 1944)[1] but capital adjustments are made annually which detract from the comparative value of the figures presented. Of course, railway collieries in British India are not subject to any payment on account of income and super taxes.

8. We do not consider that a detailed appraisal of the working results of railway collieries will serve any purpose, for larger issues and more fundamental considerations have now become prominent. There is, no doubt, the question of the efficiency of operation but there is also the potential power which the railways, as large buyers of coal, possess by virtue of ownership of mines in influencing market conditions. There has also emerged during our enquiry the need for conserving our limited resources of good coking coals, for a better and more scientific utilisation of different

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[1]Previously the rate of contribution to the Sinking Fund was calculated by dividing the capital at charge plus the estimated future capital outlay during the rest of the life of the colliery less the estimated residual value of the assets, by the estimated quantity of recoverable coal in the colliery. In lieu of this, the Railway Board have substituted the following method with effect from 1-4-44 (*vide* Railway Board's lettr No. FIII44/SF/(3), dated 4-10-44.)

(*i*) Contribution on Sinking Fund basis as hitherto but applicable to capital at charge on 31-3-44.

(*ii*) Contribution on Depreciation Fund basis at rates prescribed for Income-taxi n respect capital incurred on and from 1-4-44.

classes of coal, for a forward programme of development and increased output to meet larger coal requirements and for a reasoned and efficient regulation of State-owned enterprises. We cannot, of course, ignore the importance and necessity of maintaining an effective insurance provision for railway requirements. In the light of all relevant factors, we have arrived at the conclusion that the administration of railway-owned collieries should be permanently separated from the railway administration proper. The railway collieries should continue to be maintained and operated as a group, with an obligation to serve the needs of the railways during an emergency or otherwise. With this proviso, the collieries should operate on commercial principles of accountancy, under an integrated authority responsible to the Government of India. In a later chapter we have recommended the establishment of a corporate body to be designated the National Coal Commission and we think that the railway collieries should come under the direct management of the Commission. It is our intention that the large reserve capacity of the well-equipped railway collieries should be utilised, as far as possible, in order to fill the gap between production and requirements, particularly in the next few years, always keeping in mind that this group should constitute "a vast reservoir from which any disequilibrium between supply and demand could be adjusted at fairly short notice." We are conscious of the fact that a number of these railway collieries produce coking coal and that some of these coals might, with treatment be utilised for metallurgical purposes and that their output may have to be restricted eventually. But by then we hope that the developments in other fields will catch up with our target for production.

Iron And Steel Companies' Collieries

9. The second large group of "captive" mines belong to the iron and steel companies. We give below details of such collieries:

Total Iron and Steel Co., Ltd.

Colliery	Seams	Output (1945)
Malkera-Choitodih	11 to 16	188,179
Sijua	12 to 16	189,517
Jamadoba	13 to 18 and below	..
	13 Jorapukur	294,194
	Do.	269,642
		941,532

Indian Iron and Steel Co., Ltd.

Noonodih-Jitpur	18 and below	203,053
Chasnalla	Do.	47,201
Ramnagar	Coking (Raniganj field)	106,714
		355,968

The Tata Iron and Steel Co., Ltd., have also under negotiations another large coal property in the Bokaro field; and they have taken concessions over certain areas in Central India.

We have briefly touched upon the place the output of the iron and steel industry's "captives" occupies in the production picture. We have also referred

to the importance attaching to the steel industry in India. Our proposals for conservation proceed directly from our recognition of this importance and in the context of our limited resources. we come inevitably to the conclusion that the output and use of good coking coal should be regulated. We have suggested earlier
that as soon as practicable, and without sacrificing the overall requirements programme, the production of good coking coal should be restricted. In restricting output, we have recommended that the captive collieries of the steel industry should come first. They are an essential reserve for the future and when the need for an emergency reserve or an insurance against short supplies is no longer present, they should be the first to cut down even on their "economic" output.

During the course of our investigation, we were presented with a possible contingency, namely, that such curtailment may necessitate the closing down of certain commercial mines and the State may have no choice but to acquire them. Should such a situation arise, it is possible that the coal properties acquired by the State may become large enough to form a homogeneous whole. In that eventuality, we have considered the continued existence of iron and steel work's by captive collieries, for it may become desirable to form one unified pool of all good coking coal properties, which may come under the direction of the proposed National Coal Commission. We are glad that to our hypothetical question, whether in the above set of circumstances, the two steel companies would agree to throw their colliery units into the pool, an answer in the raffermative was forthcoming. We trust that this will not be necessary, but it will be advisable for the National Coal Commission to watch the position and keep in the forefront of their plans the need for carefully husbanding the limited resources of good coking coal.

10. That the contingency referred to above may not be remote will be apparent from a consideration of a group of "captive" mines belonging to the Eastern Coal Company Ltd., and under the Managing Agency of Messrs. Mackinnon Mackenize and Co., We tabulate below certain details of these collieries :—

Colliery	Seams	Output (1945)
Bhowrah	15, 14A, 14 and below	175,911
Amlabad	18 and below	74,515
Pootkee	16A, 16, 15 and below	79,419
Kankanee	16 and below	95,624
		425,469

The output from this group was presumably utilised in the past for bunkering purposes. All these mines produce good coking coal. An absolute ban on the use of such coal for purposes other than certain approved needs within the country would put these collieries out of commission, unless the Managing Agents decide to enter the future limited market for such coal and remain content with their quota of production. We do not suggest any particular course of action but the position should be watched.

Conclusions And Recommendations

(1) We see no inherent objection to consumers owning and operating the own collieries, **but they should not be allowed to acquire coal properties out proportion to their requirements.**

(2) As the railways are the largest buyers as also the largest producers of coal in India, the power in their hands must inevitably place them in an invidious position. **The administration of railway collieries should therefore be separated from the Railway administration. They should be maintained and operated as a group with an obligation to serve the needs of the railways. They should operate on commercial priniciples of accountancy.**

(3) **Until production increases to the extent desired, the large reserve capacity of the railway collieries should be utilised to fill the gap between supply and demand.**

CHAPTER XVII

FINANCE, PRICES, WAGES AND PROFITS

Present Position And Future Requirements Regarding Finanace.

The problem of finance in the coal industry possesses one special characteristic. Unlike as in many other industries, the demand for capital expenditure in a coal mine for maintaining or developing production is of a continuous character. This is particularly true of the collieries which initially start with small capital. Apart from the 200 and odd joint stock limited companies operating in the coalfields, there are several hundred other mines operated by individuals under private financial arrangements. It is some of these latter units which suffer from lack of capital and, therefore, are not able to keep pace with the demands of a long-term policy or provide adequate technical supervision.

2. Even in the case of the larger units of production, it is rarely that reserves of any substantial order are maintained for development purposes. Commercial considerations of a short-term nature often stand in the way of building up essential reserves which a long-term policy dictates. We are informed that a well managed concern should to-day have no difficulty in obtaining capital. This may be true, but the investment of further capital as a long-term policy in the development of a coal mine cannot usually be reconciled with the need for an adequate return on the new capital invested in as short a time as possible. Besides, many of the coal mines are not well-managed concerns. A large number of them are small units unable to obtain adequate technical service and, by reason of their limited resources, unable to find money for long-term development. Apart from the money invested in the opening up of small mines during war-time, not much capital appears to have been invested in the last two decades for further development of mines or for improvements in mining methods save those suggested or enforced by safety measures.

This lack of vision is not peculiar to India. We know, for instance, that one of the reasons put forward for the nationalisation of the coal industry in the United Kingdom was the need for modernising equipment. The Coal Industry Nationalisation Act makes provision for an expenditure of £150,000,000 within 5 years on new plant and equipment for the purpose of rehabilitating the British coal mines. We are certain that the need for modernizing equipment is far greater in Indian mines.

3. We feel that alongside the arrangements we have suggested for introducing stability in the coal industry provision should be made for rendering financial assistance to such of the deserving mines as require this assistance both for improving their mining technique and for pursuing a policy of systematic development. Because of the hitherto unstable nature of the industry, coal operators have in the past not been able to obtain finance at reasonable rates. Some of them have been forced to contract with middlemen for their day-to-day needs of working capital. Others have resorted to borrowing money on *hundis* at high rates of interest. The majority of these collieries do not receive payment for their supplies reasonably quickly and are, therefore, compelled to resort to borrowing for their day-today operations. But all this has nothing really to do with the provision of finance for long-term development. We must keep the issues separate and find ways and means for dealing with the dual problem of the short-term and long-term needs of the collieries under a system of stable prices and cant roled distribution which, we envisage, will continue for some years, *i.e.*, for so

long as supplies fall short of production. We hope that short-term coal financing will become an acceptable form of business with bankers. Facilities for the discounting of coal bills need to be developed and suitable measures adopted for providing increased banking facilities for the operators of small mines.

4. The number of joint stock colliery companies in India on the 31st March, 1942, was made 218, with total paid-up capital and debenture issues of Rs. 1,035 lacs, as against 243 companies in 1925-26 with Rs. 1,261 lacs as paid-up capital, etc. *Prima facie*, it would appear that during 17 years, mostly of depression, the total capital invested in the corporate units of the industry has decreased. It is difficult to estimate the capital invested in smaller proprietory coal concerns, although two members of the Coal Mining Committee, 1937 estimated this to be about Rs. 4 crores. The figure may be slightly higher to-day owing to the opening up of an additional 200 small mines since that Committee reported. There is no evidence, however to suggest that the coal industry to-day commands greater financial resources save those that the indirect influence of high and stable prices has provided. The good profits of the war years have not been conserved for development or reserve purposes except in a few cases. It is, of course, true that the private small owner never starts with any intention of accumulating reserves, but a re-orientation of outlook is necessary if financial provision for a programme of rational, long-term development is to be made.

5. In the sphere of long-term financing the inadequacies of the small operator cannot be put right through ordinary banking facilities, the radical defects of the small mine arising out of size and grotesque boundaries must be corrected if a plan of systematic mining development is to be implemented. Finance here is secondary to structural adjustments which are necessary. Nevertheless, after the coal industry is placed in the position of a healthy "risk" for the bankers and shorterm facilities including discounting of bills are available, there will still remain the problem of coal finance in respect of the increasing needs of the industry. We therefore, welcome the announcement made by the Finance Member in the last budget speech (February 28, 1946) that detailed proposals for the establishment of an Industrial Finance Corporation will soon be placed before the Legislature. This Corporation is designed "to ensure the availability of medium and long term credit to industrial enterprise in India where the more normal methods of industrial finance are inadequate." The Industrial Finance Corporation has been a long time in coming. Proposals made by the Industrial Commission in 1916 included the provision of assistance to industrial concerns, particularly when an enterprise adds to the productive power of the country and provides employment. The Central Banking Enquiry Committee of 1931 specifically recommended the establishment of an Industrial Corporation in each Province to ensure the provision of facilities to old and new industries. The proposals of the Finance Member still remain to be implemented and we assume that they include provision of finance for the coal industry also. If, however, the proposed Corporation does not provide for the needs of the coal industry, it will be necessary to consider other means.

Prices And Wages.

6. Apart from finance, the three other determinants of stability in an industry are prices, wages and profits, These three must be treated together, as inherently they are functional factors and are closely linked with each other. For instance, the best prices are not the highest prices one could obtain but the prices that will induce the largest production and stimulate the demand. Similarly, the best wages are not the highest, wages, but the wages that ensure the basic needs of the workers and encourage increased employment.

7. The old theory of prices being determined by the cost of production. of which the principal element is the cost of labour, is now no longer advanced and there has emerged a more correct concept that, in a system of free economy, what the commodity *has* cost to produce does not directly determine its market value, but what it *will* cost to produce may determine whether or not it will be produced or how much of it will be produced. Prices under this concept are determined by what the economists call marginal utility, but the essence of this analysis is the influence which the productivity of labour exercises or should exercise on the level of prices. It is clear that wages are not low in India and high, for example, in Britain because Indian employers are niggardly and follow a "low wage" policy or British employers generous and follow a "high wage" policy. Wages are high or low because of the marginal productivity of the worker as exhibited in an unregulated economy.

The productivity of labour is accordingly as essential an element in determining the price level as in planning a progressive policy of labour betterment. *prima facie* price levels should contain such features as will provide for an increase in the productivity of labour which, we think, can be secured only through a humane approach to the labour problem. In other words, the start should be from the worker as a human being and, apart from any other factor, his basic needs as an individual should be the first item in our tabulation of various elements in the price structure. There have been many occasions in the past history of the coal industry when a fall in prices induced attempts to reduce mining costs, and as wages comprise the largest item of pithead costs to cut them as much as possible. In several European countries the striking rise in O. M. S.[1] in the thirties merely reflected the pressure to offset lower prices by lower labour costs and did not mean any absolute increase in the earnings of the miner. O. M. S. is a composite resultant of various factors of which the workers' skill and aptitude and managerial improvements are the most important. It was nevertheless, patent that the fall in prices induced a decrease in real wages which, however, was counteracted, perhaps for a time, by an increase in output per man day. If, however, it is granted that a miner, as an individual, is entitled for his toil to receive the equivalent of his basic needs, as we think he is, then, in framing the price level of his product, such basic needs must be translated into a minimum wage. It is not merely a question of "fair" wages or "fair" prices; we have stated that both prices and wages are functional and, therefore, if wages form the starting point for determining the price level, there is in this proposal a dynamic feature which implies a conscious attempt to improve the status as well as the productivity of the miner.

We are aware that we are advocating the transformation of the hitherto accepted "price-wage" relationship into a "wage-price" one. In this connection, the measures recently adopted in France (as reported to the meeting of International Labour Office Committee on Coal Mining held early this year) are instructive :—

> "When after the liberation of France the question of regulating working conditions and wage rates by a collective agreement came up great efforts were made to find a suitable method of calculating wages. Finally a Departmental Order of 1 June, 1945, gave final shape to a new method which had been worked out for settling miner's wages. The average hourly wage of unskilled workers in the Paris area in the highest paid industry,

[1]Output per man shift.

that is the metal industry, is taken as the basis. This Paris wage is decreased by an amount fixed according to the zone in which the minefield is located. The wage is then increased by 12·5% for unskilled surface workers and 25 % for unskilled underground workers. The wage rates of other groups of miners are worked out in relation to the wages of an unskilled surface or underground worker as the case may be."

We feel that the present time demands the adoption of a method which will make the selling price of coal dependent on the miner's wages and will base such wages on social considerations. This is not a mere concession to the new time spirit, for we believe that in our efforts to introduce healthy and stable conditions in the industry, we must make sure that the prime instrument of production is treated with dignity and shared respect, thereby engendering a cycle of increased productivity, better real wages, and dynamic stability. It may be urged that to give priority to the social security factor in a country like India is a futile ambition, but we contend that because of the economic and social poverty prevailing in India, it is more urgent that we should not experiment with the exploded doctrines of the pre-1914 era but, recognising the importance of social considerations, model our economy on a more enlightened and humane basis. Even in the United States of America, the home of free private enterprise, it is being increasingly felt that the capital-labour relationship cannot be improved without a full recognition of the social security aspect of work. In the words of Mr. Robert W. Johnson, the Chairman of Johnson & Johnson, the big manufacturers of surgical dressings

> "We stand convicted at the bar of public opinion of crimes in the field of human engineering.....In the mind of the man in the street, management is condemned.
>
> "Management's main crime is executive myopia....a disease of those with high rank.....organised razzle-dazzle, the derangement of top management, otherwise known as 'industrial bureaucracy'. Specifically, business has plunked for the lowest wages when it should have become the champion of the uuderpaid.....Is there no one in business who will think of being ahead of the next catastrophe instead of running after the one that has already happened?
>
> "What should be done, is to establish personnel departments which would see that workers get: (1) a sense of security, (2) fair wages and short hours, (3) qualified and fair-minded foremen and department heads, (4) opportunity for advancement, (5) consideration as individuals."

8. We have already referred to the general opinion expressed before us that control over prices and distribution should be maintained for as long as the coal shortage continues. We think that the period of short supplies provides an ideal opportunity for Government to introduce the element of social security for the miners as one of the basic considerations for determining the proper price level for coal. It is generally accepted that wages and prices are closely connected and the matter of stability therein is aptly summarised in the British White Paper on Employment Policy (Cmd. 6527):—

> "There must always be room for the adjustment of wages and conditions, *e.g.*, on account of changes in the form, method or volume of production. Also there must be opportunity for

the removal of anomalies in the rate of remuneration of different grades and categories of workers, both within a industry and between different industries. The principle of stability does mean, however, that increases in the general level of wage rates must be related to increased productivity due to increased efficiency and effort.

An undue increase in prices due to causes other than increased wages might similarly frustrate action taken by the Government to maintain employment. If, for example, the manufacturers in a particular industry were in a ring for the purpose of raising prices, additional money made available by Government action for the purpose of maintaining employment might simply be absorbed in increased profit margins and no increase in employment would result.

Stability of wages and stability of prices are inextricably connected. If the general level of wage rates rises and there is a corresponding increase in prices of goods for civilian consumption, the individual wage-earner will be no better off and there may be no increase in the total amount of employment available."

The dynamic aspect of stability is well brought out in the above excerpt and it is an aspect which must be kept in the forefront at the price-making level.

9. When we come to consider the actual price structure for coal which would correctly reflect the various elements of price and the relative values of different sizes and types of coal, we find the task none too easy. A brief historical recapitulation may be helpful.

A statement showing the average coal prices in India from 1920 to 1943 is attached as Appendix XIX. The statutory prices fixed in 1944 are much higher than the prices for the period 1920-1942. A superficial comparison between the current and pre-war prices would be misleading as the pre-war prices were at times uneconomic. The fall in prices from 1923 onwards was mainly due to the gradual decrease in the demand for coal which intensified competition. There was a vicious circle of over-production, cut-throat competition and uneconomic prices. In the result, such requirements as depreciation on equipment and depletion of reserves were disregarded. An exhaustive study of the various factors involved is contained in the report of the Coal Mining Committee, 1937.

With the out-break of the war in 1939, the internal demand for coal gradually began to increase. The years 1940 and 1941 made no significant impression but, subsequently, the intensification of the war in Europe and the extension of hostilities to the East brought a large increase in the demands of the railways and other essential industries. The result was that the average pithead price of coal rose in 1942 to Rs. 4-7-0 from Rs.-3-11-0 in 1941 (*i.e.*, by 20%) in spite of the fact that 1942 was a year of peak production.

In 1943, the coal situation become critical. The cumulative result of keeping production costs at the lowest level during the pre-war years began to be felt. The miner's wages had been kept low and repairs and renewals to plant and machinery had been neglected to reduce production costs. The industry was therefore not in a position to respond to the emergent call for increased production.

Attractive wages and congeinial surface employment offered by large scale military and other works, better prices for agricultural produce, and other factors combined to take labour away from the coalfields. The colliery owners themselves were not infrequently reluctant to exploit more energetically their " wasting asset " under war-time Excess Profits Tax.

All these factors brought about a fall in raisings in 1943. On the other hand, however, the requirements of the railways and other consumers rose very considerably. There was, in consequence, a very steep rise in coal prices in 1943. Prices as high as Rs. 60 per ton were demanded in many cases and paid. The necessity for controlling prices was felt even in 1943; but on account of the heavy drop in production, the Government of India did not consider the time opportune for introducing price control, as such a measure, it was felt, might have a further adverse effect on the already declining output.

10. The Government of India took various measures at the time to arrest the fall in production. Of these, the following are relevant to the question of the coal prices, as they inevitably increased the cost of production to the colliery owners :—

(*i*) the provision of foodgrains to labour by the collieries at concession prices;

(*ii*) an increase in wages by 50% over the pre-war rates; and

(*iii*) provision of motor transport for transporting labour from the out lying villages to the collieries.

When early in 1944 it was decided that coal prices must be controlled these increases in the cost of production had inevitably to be taken into consideration. The then prevailing prices could not be ignored in entirety and the need for ensuring a reasonable margin of profit to the colliery owners, such as would overcome their inertia had to be borne in mind.

11. In respect of the wages received by the miners, the Labour Department, Government of India, have informed us that the position in 1944 was as follows :—

" It may be said that skilled workers, like miners, earn on an average Re. 0-14-0 to Re. 1-0-0 a day, while women coolies earn about Re. 0-8-0 a day. In addition, the value of food concessions would work out to Rs. 1-1-8 in Jharia, Rs. 1-5-0 in Raniganj and Re. 0-15-0 in the Pench Valley collieries per worker per week. The workers also receive free housing and free fuel.

An analysis of family budgets shows that in Jharia, an average family of 3·62 persons earns an income of Rs. 12-3-6 per week and spends Rs. 10-10-2; in Raniganj a family consisting of 2·68 persons earns Rs. 9-9-3 and spends Rs. 8-1-9; the average weekly income of the family in the Central Provinces consisting of 4·33 persons is Rs. 8-12-7 and the average weekly expenditure is Rs. 7-13-0. In all these cases, the bulk of the expenditure is on food which consists mostly of cereals, wheat, barley or jawar and very little of protein and protective foods like meat, milk, milk products, vegetable, fish, etc. Of clothing on an average a man has 1·10 dhoties and 2·50 shirts and a woman 1·96 saries and 2·20 blouses ".

By no stretch of magination can it be contended that Rs. 12-3-6, average earning in a week, provide nutritional sustenance, adequate clothing and other basic needs for an average family living in Jharia. On the other hand, it must be admitted that Rs. 12-3-6 represent the earnings of the family for the $4\frac{1}{2}$ days they work in a week, and that they could earn more by working a 6-day week.

12. The *ad hoc* fixation of prices under the Colliery Control Order in 1944 was dominated by the need for more production and hence increased costs, occasioned by higher wages and grain allowances, etc., and an additional inducement for colliery owners in the shape of an increased margin of profit inevitably figured largely in determining the actual scale of prices. Similarly, it is suggested that while the need for more production continues and there has arisen greater need for stabilising the industry under a planned programme, an excellent opportunity exists for implementing the obligations towards the miners ; for without such a re-orientation, our search for stability will remain futile. It must be admitted in this context that the various welfare schemes launched under the auspices of the newly started Labour Welfare Fund are a definite contribution towards stable conditions.

13. It may be that so long as the Indian miner continues to be uneducated and ignorant and so long as there is no improvement in his standard of living, anything that one may do about amenities and welfare, any increase in wages, will not yield quick results in the form of better work ; there might even be a decline in productivity and increase in absenteeism. It is stated to be the experience of coal operators all over India that labour does not immediately respond to better wages or better treatment. On this, Mr. S. Lall, Secretary of the Labour Department, Government of India, has commented as follows :—

> " It is equally true that without an increase in wages, there can be no improvement in their standard of living. The vicious circle must be broken at some stage and at some point. Unless the miner is made to appreciate the value of a higher standard of life and realise at the same time that the higher standard of life can be sustained only by increased efficiency, there is little hope either for the miner or for the coal-mining industry. The latter cannot be allowed to plead helplessness to justify a 'No change ' attitude in regard to wages. "

14. We have stated earlier that profits form an essential element in the composition of prices. The return on capital invested in the industry deserves as much recognition as investment of toil or of mind. It should, however, be recognised that investment of capital is an impersonal factor, unlike the managerial talent or the labour invested in the industry. There can, therefore, be found a relatively enduring basis for determining the return which capital in the industry can legitimately claim. We should remember, nevertheless, that the best profits are not necessarily the highest or the lowest, but the profits which encourage most persons to invest money in the industry and to provide greater employment.

15. In order to arrive at a proper basis for determining the scale of prices for various coals we endeavoured to obtain representative " costs " from different collieries, but the investigation has yielded no positive result, as the forms and methods of accounting differ from colliery to colliery and the returns submitted were by no means complete or representative.

We have taken notice of the proposal of the Ind an Mining Associat'ons to the effect that control over the of price coal meant for delivery to the railways would be sufficient to introduce stability in the price of coal for the rest of the market, but we feel that control over prices must be all along the line.

In determining the actual level of prices, all the factors mentioned earlier must be taken into consideration. We propose elsewhere the organisation of an Advisory Price Committee under the National Coal Commission. We have stressed above the importance of the social factor in determining wage, costs which should form the starting point for price determination. In respect of the differential in prices between various types and sizes of coal, we would urge proper and detailed consideration of both the utility and efficiency aspects, *i.e.*, the value of particular coals for particular purposes as well as the actual heat units made available to the consumer.

The present difference in prices between the superior and inferior coals appears to us to be small. Though we are unable to express an opinion on the adequacy or otherwise of the present prices, we consider that an early enquiry is needed and suggest that this should be undertaken and completed before the end of the current year. The prices once fixed should not be subject to frequent alterations.

Conclusions And Recommendations.

(1) **Arrangements should be made for rendering financial assistance to deserving mines.**

(2) Facilities for discounting of coal bills and increased banking facilities for small operators need to be developed.

(3) **As regards long-term financing, we suggest that the Industrial Finance Corporation should serve the coal industry also.**

(4) **A fair wage to labour should form the starting point for price fixation.**

(5) **Price control is necessary and should continue for all consumers.**

(6) **For price fixation, we propose the appointment of a representative Advisory Price Committee.** Prices fixed should not be subject to frequent alterations.

(7) The difference in the present prices of superior and inferior coals seems small.

CHAPTER XVIII

THE DEVELOPMENT OF NEW FIELDS.

The problem of the development of new coalfields is by no means easy. The Geological Survey have located a large number of fields mostly in Bihar, Central India and Central Provinces, but on the whole our knowledge of these resources is limited. The observations in these paragraphs are therefore subject to further geological exploration and prospecting, which should be taken in hand forthwith. The country is suffering from a shortage of good coal which is likely to continue, and unless immediate steps are taken to develop new fields in suitable areas, the industrial development of the country will be greatly retarded.

The scheme for the opening of new fields can be divided into two groups :—

(*i*) consisting of coalfields which, in our opinion, can and should be opened within 5 years, and

(*ii*) those which can be and should be opened within the next 10 years.

2. Under (*i*), the first of the coalfields to be developed and worked, subject to the further proving of its resources, is the Kamptee coalfield (Nagpur Dt., C. P.). It is extremely well situated so far as transport is concerned and is very near a large consuming area. The coal from the Kamptee field will be principally used for stationary boilers and because of the saving in transport and the nearness of the consuming market, it should be possible for this coal to replace a great deal of the Pench Valley and the Wardha Valley coals which are now being consumed in Nagpur city and the surrounding area. These latter coals could be sent further away, say to Ahmedabad or Sholapur, where there is an uncovered demand for them. We are definitely of the opinion that the Kamptee field should be opened up without undue delay ; a great deal of time has already been spent in discussing as to who should be granted the licence and, meanwhile, the country suffers. The best method of utilisation is probably to build a large thermal station on the field itself and to transmit electricity to Nagpur and Kamptee. We understand that the Provincial Government have the matter in hand, and we trust they will go ahead quickly, as the development of this field is of vital importance indirectly to the development of industries in Western and Southern India.

We expect that the Kamptee field can be brought into production in 1947 and in 1950, if not earlier, it should be producing about 100,000 tons of coal per annum. By 1956 its annual output should be easily over 250,000 tons. We believe that all this coal will find a ready market.

3. Next in order of urgency is the development of the newly discovered lignite deposits in South Arcot district, Madras Province. It is doubtful whether the lignite will, even if briquetted, be able to replace the good steam coal which has to be transported to the South Indian Railway over a very considerable distance. But it would certainly be of use for industrial and domestic purposes, and if the Government of Madras were to investigate the possibilities of building a thermal station for the production of electricity to be linked up with the existing hydro-electric system, the use of electricity in the Province might receive a further impetus.

We anticipate that this field could be in production next year and, like the Kamptee field, be producing annually 100,000 tons in three or four years' time. Provisionally, we have fixed a target of 250,000 tons per year for this field within the next 27 or 8 years.

4. Third in order of urgency in our opinion, is the development of the Korar field in Rewa State. This field is situated at a distance of about 7 miles from Umaria on the Bilaspur-Katni section. According to geological reports " borings have proved the following 4 seams of coal :—

8 ft. seam at a depth of 12 ft;
4 ft. seam at a depth of 23 ft.;
4 ft. seam at a depth of 29 ft.; and
8 ft. seam at a depth of 48 ft."

The area is not large, but from the outcrop of one of these seams a weathered sample yielded the following analysis :—

Moisture	5·04%
Volatile matter	12·56%
Fixed carbon	65·48%
Ash	16·92%

The coal appears to be of the same quality as of Umaria coalfield. If this coalfield is opened up by 1950, it should be possible to obtain about ½ million tons of coal annually in four or five years' time.

This completes Group (*i*) and we now proceed to Group (*ii*).

5. Pathakhera (Betul district, C. P.). This is a small coalfield of about 16 sq. miles. According to geological reports, the country is not difficult between Pathakhera and Ghordungi railway station 12 miles to the west. Mr. Gee who examined the coalfield in 1924-25 wrote as follows :—

> " This treasured coal area appears to represent a large tract which promises well to exploiters, certainly the most promising tract, so far as our present knowledge goes, of the Tawa Valley coal bearing strata ; and considering its nearness, 7 to 10 miles, from the Betul-Itarsi railway, it is surprising that the question of its exploitation has not already been taken up more enthusiastically ".

In the Pathakhera vicinity two borings, Nos. 1 and 2, were put down and proved 3 seams of coal—4ft. 8 in. at 173 ft. depth ; 6 ft. at 243 ft. depth and 14 ft. and 314 ft. depth. The 14 ft. seam and the 6 ft. seam are of fair quality while the top one is poor. Unfortunately, no information about the analyses of the coals is now available.

The Central Provinces Government we understand, are considering the question of opening this coalfield. If our recommendation for development is accepted, we expect that in the next 8 to 10 years this coalfield will be producing about 100,000 to 150,000 tons of coal which will be of considerable assistance. There are other adjoining fields and it may be worth while considering whether the metre-gauge connection which would link the Khandwa-Hingoli section with the Pench Valley coalfield, if our suggestion regarding an extension of the metre-gauge system is adopted, should be extended to this coalfield as well.

6. Korba (District Bilaspur, C. P.)—This is a very large coalfield, some 200 sq. miles in area, and is named after Korba town which is situated on a motorable road 24 miles from Champa station on the main Bengal Nagpur

Railway line from Calcutta to Nagpur. There are a number of seams and some of them appear to be promising. Mr. Gee, writing in the Records of Geological Survey of India, Vol. LXXVI No. 16 Coal, has made the following observations :—

> " This field, in the lower Hasdo Valley, includes some 200 sq. miles of Barakar outcrops. At Korba, a 70-foot seam is reported, though available analyses indicate that the coal is of inferior quality. A seam, 150 ft. thick is also recorded at other places in that locality. A 5-foot seam of attractive quality occurs near Ghordewa and a 20-foot seam one mile south-east of that place. East of the Hasno River, an important seam, 6 ft. In thickness, occurs near Rajgamar, analyses of outcrop samples giving an ash content of less than 10 per cent. and a similar figure for moisture. The field is obviously attractive and will doubtless receive attention at a future date, as it lies within 24 miles of the Bengal Nagpur Railway main line. The area appears to be relatively free from faults and no igneous intrusions have so far been met with ".

We are of the opinion that the Bengal Nagpur Railway should construct a branch line to this important coalfield. Eventually the line will no doubt have to be extended to meet the Burwadih-Chirimiri section somewhere near Ambikapur, thereby opening up other substantial coal areas covering many hundred sq. miles. If this coalfield is opened up, it should not be difficult to get 500,000 tons of coal annually from it by 1956.

7. Hutar field (Bihar)—This property has been prospected by private enterprise and is capable of being developed at a rapid pace, the only difficulties being want of railway communications and power. The area is large some 80 sq. miles, and contains a number of seams which are extremely thin. Development so far has been very limited because of the lack of railway facilities, but the proposed Burwadih-Birmitrapur section, when constructed, will help to open up the field, as will also the other lines proposed from Burwadih to the west. If this work is taken in hand immediately, it should be possible to get substantial quantities of coal by 1952, the figure reaching about 250,000 tons annually by 1956.

8. When the line between Burwadih and Chirimiri is constructed, it will pass through Ambikapur (Surguja State) which is in the middle of an important undeveloped coal-bearing area. There is reason to hope that by 1956 this area will be making a substantial contribution.

9. There are also other coal deposits, some of them fairly important which may be developed in due course ; but we need not discuss this possibility as we do not see, at the present moment, any likelihood of their being opened up in the next 10 years or so. There is however, one area in Assam in the Garo Hills, abutting on the Bengal plains north of Mymensingh, to which we should refer. The Government of Assam are anxious to develop this area on a large scale, but are at present handicapped by the lack of railway communications ; the nearest railway station is some 80 miles away to the south. The development of the area is no doubt a possibility, but as we do not know whether this will materialise within the next 10 years, we have not taken it into our calculations.

10. The coal deposits in the Kashmir State, though containing good coal—of almost anthracitic quality—cannot be developed because of the lack of communications. They are being worked in a small way. But at present we

do not see that their development on a large scale is an economic proposition. The Kashmir Government are, however, extremely anxious to develop them.

11. To sum up, we have indicated a number of areas where, we think, new development can be encouraged by Government and the railways by the construction of comparatively short branch lines within the next two or three years. Fortunately some of them are already on the railway programme of development. We would only suggest to the railways to give them due priority over other less important schemes. Apart from local importance, the construction of these lines will have an all-India bearing, as they will ease the economic situation by providing more fuel for industrial purposes and thus give further assistance in the industrialisation of the country. Between them, the new fields should provide in the next 10 years about 2 million tons of coal per annum.

12. In connection with the development of the new fields, we have to consider a number of important questions such as finance, technical assistance, machinery and plant and labour. It would be pertinent to recall that during the war, when Government wanted to increase the production of coal, they had to resort to various schemes of financial and other assistance to the coal mining industry. The question, therefore, for consideration is whether in view of the acute shortage of coal we should recommend similar measures to those. After careful consideration, we have come to the conclusion that provided the coal to be produced from these new enterprises is likely to find a steady market at a reasonable price, Indian capital will be forthcoming to develop the fields. It will, however, be necessary for Government to help would-be producers in finding the necessary mining machinery and technical advice. Labour should not be a great difficulty, as most of the coalfields which it is proposed to develop are situated in areas in which labour is likely to be available.

Conclusions And Recommendations.

(1) **The development of new fields should aim at an output of 2 million tons per annum by 1956; but a reasonable price and asteady market are essential pre-requisites to development.**

(2) **Certain additional rail transport facilities will have to be arranged to enable these fields to be developed.**

(3) Government may also have to help in importing machinery and providing technical advice.

(4) Labour is not likely to prove a difficulty in the development of new fields.

CHAPTER XIX

STATE OWNERSHIP AND MANAGEMENT OF THE INDUSTRY

As illustrating the modern trend, we quote the following from the International Labour Office publication "The World Coal Mining Industry, 1938":

> "The coal mining industry in all countries has passed out of the era of free competition into one of economic and social control in which production, marketing and prices are largely governed by combines, cartels etc., which are subject to the regulation of public and semi-public bodies".

Public control took the form of rationalisation in some countries such as the United Kingdom and Germany, which attempted to regulate production prices and distribution in varying degrees, and of State ownership and operation, which automatically provided complete public control, in others such as Russia and Holland. France, too, was embarking on nationalisation of the coal mines, a step since implemented, and more recently,we have the example of nationalisation in the United Kingdom. Rationalisation, in the words of the Coal Mining Committee, 1937, provides "purposive direction to production, distribution and consumption. It therefore tries to eliminate the mis-direction and mis-calculation of individual enterprise. It denies that industry is organised to enrich individuals at any cost to the co-community.....the main object is to increase national efficiency and national income by State control and supervision combined with better organisation and better methods". But if rationalisation fails to secure the objects in view, the assumption made by certain schools of thought is that the gulf between private ownership, with its accent on personal profit, and the public interest, is unbridgeable, at any rate under any workable system of control. If the control becomes so all-pervasive as to leave no discretion whatsoever to the owner, the *raisond' etre* of private enterprise disappears and no justification for its continuance remains. This and the undoubtedly over-whelming difficulties of enforcing a detailed control in the teeth of possible opposition provide, it is argued, more than adequate reason for the replacement of private ownership and operation by State ownership and operation. The State, as the repository of public conscience and the guardian of national interest, is then enabled to direct the affairs of the industry so as to secure increased "national efficiency and national income".

2. It is too late in the day now to question the theoretical justification for State ownership and operation. Besides the colossal example of Russia, it has been increasingly realised all over the world that in certain spheres of activity, public ownership and operation provide the only correct form of organisation. In India we thus find the principal railways,the postal and telegraph services, and some other public utilities owned and operated by the State. The efficiency of public operation may not always be of a uniformly high standard, but in a well-ordered State, there is at least a reasonable certainty that activity will be so directed as to secure the maximum public good. But that good undoubtedly suffers when efficiency is lowered beyond a certain level and hence the great importance of efficiency in public operation.

3. In regard to so vital a service as that performed by the coal industry to the country, it was inevitable that we should have considered the case for State ownership and operation. The question was briefly dealt with by the Coal

Mining Committee, 1937, but they preferred rationalisation of the coal industry as the only course that could produce the immediate results deemed necessary. Nationalisation presented financial difficulties and there would, besides, " be great practical difficulties in valuing properties.....and the process would probably not be completed for about 10 years ". The Committee further observed that " it has been suggested that, as the State already manages most of the railways adequately, there is no reason why the State should not also manage coal mines, but it seems to us that there is a great difference between running an administrative service and producing commodities or raw materials for sale in a competitive market ". But there is a more exhaustive discussion of nationalisation of the coal mines in the Supplementary Note of Messrs. Nag and Krishnan to the Report of the Committee. After describing the parlous state of the indsutry, they concluded that State acquisition of the mines (and the minerals) was the only solution, for it had the following advantages amongst others :

(*i*) Systematic development and working are possible only under State ownership. The primary consideration of profit making will be subordinated to sound mining methods.

(*ii*) Conservation as applied to utilisation is possible only under State ownership. Under private ownership, waste in mining can perhaps be controlled, but certainly not waste in use.

(*iii*) A proper balance between production and consumption can be kept up ; over-production and cut-throat competition which are prominent features of the present market will be eliminated.

(*iv*) One of the worst features of mining in India is the status and conditions of labour. Under State ownership labour will be better organised and looked after as is the case, even now, in the State Railway collieries, as compared with the majority of private collieries.

Elaborating on their conclusion, Messrs. Nag and Krishnan observe as follows:

" This (acquisition of mines) is imperative and urgent in the case of at least the two most important fields; *viz.*, Jharia and Raniganj. This is, in our opinion, the only step which will save these two fields from the present dangers and rapid depletion and make conservation effective therein. After acquisition, the fires should be put out, the weak areas stabilised, and a systematic scheme drawn up for working intensively on sound and economic lines in selected and limited areas, accompanied by stowing wherever necessary and the output of different qualities of coal regulated according to requirements.

" The aggregate paid up capital of joint stock coal companies working in India is computed at Rs. 10,45.05,969 in 1935-36 (see 'Indian Coal Statistics, 1935'). Excluding the mines in Nizam's Dominions and other Indian States, the amount will be about Rs. 8,50,00,000. The capital invested by individual mine-owner and private syndicates may be taken as about Rs. 4,00,00,000 making up a total of Rs. 12, 50.00,000 for the whole of British India. For the Bengal and Bihar fields alone, the valuation will probably not exceed Rs. 11,00,00,000.

"We have taken into consideration the fact that there are some companies which are paying dividends and whose shares sell at a premium and therefore represent a higher value than the paid-up capital; but this will be more than balanced by the large number of non-dividend paying companies whose shares are below par. These figures give an approximate idea of the cost, but the valuation will have to be done by a competent tribunal, taking all the various relevant factors into account.

"The above sum represents the cost of acquisition of the mines in Bengal and Bihar excluding the Railway collieries. We are confining our attention to these fields because of their importance, and attention may be given to mines in other provinces in due course.

"In addition to the above, a further sum may be necessary for developing new properties, especially those bearing low grade coals, for the purpose of balancing up the restricted output of good quality coal, and for the reorganisation of the industry. A sum of Rs. 4,00,00,000 would probably suffice for this purpose, so that a total of Rs. 15,00,00,000 will be needed in connection with the acquisition of the mines. This can easily be raised by a loan in India carrying an interest of 3 per cent.

"With the entire coal mining industry in the hands of the State production and consupmption can be co-ordinated and the prices regulated on quality so as to give an average net yield of 12 annas per ton (*i.e.*, over and above the cost of working including stowing, contribution to royalty charges, depreciation, workmen's compensation and welfare, etc.) on the despatches. The cost of coal on this basis should not cause any hardship to the consumer. It will be seen that the "net profit" on despatches of 18,000,000 tons will amount to Rs. 1,35,00,000 which will represent an yield of 9 per cent. on the capital investment. This income may be distributed as follows: 3 per cent. for interest charges, 3 per cent for redemption of capital; and the remainder should compensate the Government for loss of revenue such as Income-tax and cesses which would have been derived from private owners had they continued to work the mines.

"If, on detailed investigation, it is found that the capital cost of acquisition of the mines and minerals, or the interest on the loan raised is larger than that estimated by us, it will not materially affect our argument, for the price of coal can be regulated so as to cover the interest and other charges. An adjustment in the 'net profit' per ton between the limits of 12 annas and Rs. 1-8-0 is probably all that will be necessary."

4. To start with, we would like to say that we are not opposed on principle to the State ownership and operation of the entire coal industry in India. Actually, we have stated in an earlier chapter that such ownership and operation may become essential at some future date. The State does even now own and operate certain mines on which capital equal to approximately 1/3 of Messrs. Nag and Krishnan's estimate of 1936 has been invested. But, as throughout the rest of our report, we have considered whether the proposal to nationalise the whole industry is immediately practicable, even if it were

thougth desirable. We think that State acquisition of mines ought not to be undertaken until mineral rights have been acquired. It is true that mineral rights in the areas worked by the railway collieries are privately-owned and that this does not seem to have seriously affected operations. But there is an important difference of degree ; that limited operations have been possible under existing circumstances is not necessarily a guarantee of sucess for the whole of the industry. This apart, it will be almost impossible to conduct operations to the maximum benefit of public interest so long as the State owes allegiance to the private owners of the mineral, with attendant irksome consequences. We hope our view in this matter will be accepted as sound. Secondly, suitably trained mining engineers are still not available in the country in sufficient numbers to staff the mines, direct the technical operations and run the administrative machinery under the regime of State ownership and operation ; for it cannot be assumed that all of the foreign technical talent now at the disposal of the industry will continue to be available in altered circumstances. This is not to say that the industry, whether under State or private ownership, should perpetually be dependent on technical men from other lands, but is a plea for realism and an argument for rapidly augmenting the supply of suitable personnel and facilities for their advanced technical training. Premature action in this matter, we are convinced, is bound to have adverse consequences. We think it is the course of prudence to wait and see to what extent the various measures of control we have recommended will succeed ; to assume that they will fail, because such control failed, for example, in the United Kingdom, would be unwarranted. On the whole, we do not think that State ownership and operation of the entire coal industry is a practical issue for the next ten years, the period to which we have devoted particular attention throughout our report.

5. Amongst the problems facing the industry, one of the most serious is that of labour. Elsewhere, the alleged failure of private enterprise to give a fair deal to coal-mining labour has been one of the potent causes of nationalisation, for it is assumed, with considerable truth, that the State can and will take a fairer view in this matter. That coal-mining labour in India is worse off than in most other countries is indisputable; that this is probaly partly due to the weakness and ignorance of labour, the lack of public conscience and Government apathy also seems clear. We are only just beginning to realise the rights and dignity of labour ; but an improvement in conditions can come only when the tools which are now being fashioned are ready. Of these, one of the most important, in our opinion, is the propagation of knowledge ; for it advances mutual benefit to have to deal with a labour force aware of its rights and responsibilities. We need, too, more and better houses, improved surroundings, reasonable amenities, and above all, a living wage. All these must be secured, but they will take time, however, much we hurry, as we must. It may be that eventually a labour force organised in strength and knowledge will become incompatible with private enterprise in the coal industry. That would be the time for a transference of allegiance.

6. Though we do not advise State ownership and operation of the entire coal industry immediately, we envisage that State participation in both will probaly increase in the near future. For instance, if situations detrimental to national interest cannot be remedied by control, the State should intervene to acquire and operate the mines. In this category would come unreasonable failure to stow for conservation and obdurate refusal to amalgamate uneconomic holdings. There is yet another direction in which we foresee an

extension of Government ownership and operation. We have stated what the country will need by way of coal for expanding and maintaining industrial effort and in other chapters we suggest how and where, in our opinion, the extra coal must come from. We there express the hope that private enterprise will, given certain reasonable assurances, provide the extra effort needed. But our hope may be belied ; and if that happens, we are quite clear that the duty of filling the gap between output and demand must be shouldered by the State. In India, State experience of the mining industry has so far been mainly from the producing angle, though during the recent war the first step was taken in the regulation of use and distribution. We have stated earlier that the need for scientific utilisation may eventually make the complete regulation of use essential. Regulation of use cannot be achieved without the regulation of distribution and both in turn may depend for success on the control of marketing or even the assumption by the State of the function of marketing. On such foundations should we build up State activity throughout the industry.

Conclusions And Recommendations

(1) We do not think that State ownership and operation of the entire coal industry is a practical issue for the next ten years.

(2) Nevertheless, State ownership and operation may have to be extended in certain eventualities.

CHAPTER XX

PLANNING FOR PRODUCTION : THE SUMMING UP.

The programme for coal production is determined primarily by the requirements of the country and to a lesser degree by a number of other factors. As we have shown, industrial and other coal requirements are expected to increase steadily and to reach by 1956 a figure of about 39 million tons annually. But present production at about 30 million tons per annum is still short of immediate requirements by nearly 4 million tons. A very considerable increase in production is required in the next few years if the supply of coal is to keep pace with the growing demand. And it is not merely the apparent lag that has to be made up, for we should try to effect within the next 8 or 9 years a curtailment of the output of good coking coal by about 3½ million tons per annum. The total new production will, therefore, have to be about 15 million tons per annum, about half of the present output and both relatively and absolutely (for the Indian coal industry) the task is an immense one.

The history of the coal industry in India during the last 25 years gives grounds for believing that there are elements in it which tend periodically to create conditions of instability. Expansion of the industry on the scale contemplated cannot obviously be undertaken unless the elements that make for instability are sought out and dealt with. This apart, it needs to be considered whether circumstances or situations which bar the way to sound development exist and if so to take appropriate action. What is needed, therefore, is purposeful planning and direction of development. It is now recognised all over the world that orderly commercial and industrial development can be achieved only through co-ordinated planning. For historical reasons, we consider that the coal industry cannot by itself evolve a plan of orderly development.

The task of planning and direction must be shouldered by the State for this reason and because large national interests depend on this vital industry.

2. The first essential pre-requisite to the implementation of a plan is the presence of units of production organised on sound lines, for a defective structure may lead to instability or unsystematic operation. There does not appear to be anything inherently wrong in the structure of the coal industry in India, with the exception of some small collieries. Much has been said in the past about the role of Managing Agents in the coal industry, but a fair statement of their activities would be that the system has come to stay, that it has been responsible for much good but has also been culpable in certain respects. The second main structural form in the coal industry is the captive colliery owned and operated by certain consumer interests. There is ample justification for its existence provided it does not take on proportions out of all relation to the requirements of a consumer. Of a slightly different nature are the collieries owned by the Indian Government Railways. The fact that the railways are both the largest producers of coal and the largest buyers tends to place them in an invidious position and invests them with powers that in the past have been used thoughtlessly, it is alleged, and so have affected the stability of the entire industry. We see no inherent need for associating together the administration of the railways and their collieries, though we agree that the latter should primarily serve as a cushion for the railways in times of short supplies from the market. This can be equally well secured by

separating the administration of the two, as since June ,1944 ; the present separation should, therefore, in our opinion, be made permanent. Falling under the third structural form, *viz.*, privately-owned collieries, come certain small collieries which, in a number of respects, are detrimental to national interest. These collieries are mainly the result of indiscriminate leasing and fragmentation of coal-bearing areas. For reasons of size, shape and finance they are frequently unable to adopt systematic methods of working with the object of maximum extraction ; and their presence may militate against the orderly and centralised development of an area. We consider that a detailed investigation of the present position as regards fragmentation should be undertaken and that, in appropriate cases, the State should compel amalgamation of adjoining areas by virtue of powers taken.

Associated with the structure of the industry is the question of State ownership and operation which may be considered to be the ideal form of organisation from the point of view of purposive and planned activity. We consider, however, that in India, at present and for the next ten years at least, nationalisation of the coal industry is not practicable even though it were considered desirable. There are important preliminaries to be completed before the State can embark on ownership and operation of the industry.

3. A sound mineral policy is obviously of great importance to orderly development. But hitherto Government have given little attention to the need for leasing out coal-bearing land in accordance with a pre-determined plan of development. And in the two most important provinces of Bengal and Bihar, Government are not in a position to exercise effective control due to the vesting of coal rights in private hands. This private ownership has been attended with many evils which persist even today. There is a wide diversity of royalty rates, salami is rampant and has been responsible, in the main, for a great deal of fragmentation, and vast areas are leased out on a semi-permanent basis and with no prospect of development within measurable time, and without regard to technical considerations ; there are besides a number of disabilities from which the private owner suffers in the exercise of his rights. After full consideration of the existing situation, we have reached the conclusion that salami should be abolished, that royalty rates should be placed on a uniform basis, that development should be directed in an orderly manner and that excessive holdings may have to be divided up in certain circumstances. But in existing conditions, these aims cannot be achieved in a simple manner or without investing private individuals with powers which the State alone ought to exercise. The only correct solution is for the State to acquire mineral rights in the Permanently Settled areas and then to address itself to the task of remedying the present situation. That the State itself, in the past, has been negligent in some respects is not a valid argument against a course which reason dictates as essential for the future. Moreover, the possibility that the coal industry may, in due course, be nationalised in this country reinforces our conclusions.

Once the State is the owner of coal rights throughout the country, more orderly development should be easier of realisation. But there is need, not hitherto properly appreciated, for informed technical guidance in the leasing out of lands and the development and working of an area.

We estimate that the acquisition of mineral rights in Bengal and Bihar would not cost more than about Rs. 6½ crores. The basis of the compensation we suggest in normal cases is ten times the royalty income in 1945 for known coal-bearing areas that are being worked. Known but unworked areas will

receive nominal compensation, and the mineral rights in coal at depths below 2,500 feet and in areas in which no coal has been found so far will be vested in the State without compensation. The task of acquisition should, we consider, be undertaken forthwith and completed within 2 or 3 years; the procedure might be that adopted in the United Kingdom under the Coal Act, 1938.

There is need for uniformity of policy and practice in respect of mining leases and mineral development throughout India and the co-operation of the Indian States should be sought in securing such uniformity.

4. Price has been a prime element of instability and distress in the coal industry in the past and unless there is a reasonable assurance of stable and profitable prices for the future, it is most unlikely that private initiative will be forthcoming in the considerable expansion of production that is necessary. But we must adopt the principle that price must be determined by the wages of the miner, the other costs of raising and a reasonable margin of profit; the idea that the price must determine the wage is unsound and outmoded and must be rejected. Other costs and profits are more or less matters for arithmetical calculation but in the determination of the wage must enter the social consideration of ensuring for the worker a reasonable standard of living; the principle gains in importance in the context of the present inadequate and unsatisfactory labour force that serves the coal industry. Only by offering reasonable wages and amenities can more and better labour be attracted. But there may nevertheless be an over all shortage if we are to rely only on the traditional sources of recruitment for coal mining labour; other sources must, therefore, be exploited. Even so, it would seem desirable to direct development in new areas with the object of securing the maximum adoption of mechanisation for coal cutting and loading; for mechanisation can probably produce quickly the extra coal we need.

5. Coming to actual development, we think that there is scope for increasing very considerably the output of the principal fields now being worked. But expansion in these fields is equally a problem of improving rail transport facilities and for this reason, we shall deal with them alongside our consideration of transport requirements. There are, however, some other fields not hitherto properly developed, in which transport is not a limiting factor. These, we think, should be opened up as quickly as possible with the object of attaining a production of at least 2 million tons of coal annually by 1956.

PART III

CHAPTER XXI

DISTRIBUTION, MARKETING AND TRANSPORT IN RETROSPECT.

In this chapter, we propose to describe briefly the methods of marketing, distribution and transport which existed before the war, and the changes in them which the war brought about.

Pre-war Marketing.

2. The sale and purchase of coal was entirely a free market, except for the captive collieries, and even these, including the railway ones, were not above selling occasionally in the open market. Producers made every effort to sell as much of their coal as possible in order to reduce their costs of production; consumers bought as they pleased, generally on considerations of comparative price and quality, and in some cases the reliability of the supplier. Contracts were usually for a given quantity to be delivered over 12 months, but there were also small sales of spot lots and, in the case of some of the biggest consumers, there were long-term contracts extending over a period of years. Quality was to some extent determined by the Coal Grading Board classifications, but was more usually judged by the known quality of the coal produced from particular seams or collieries; and many consumers were very particular not only about the seam they purchased from but also the colliery from which the coal was to be delivered. Price was, of course, a matter of bargaining, but the general price level throughout the year was set by the price tendered to the railways for their very large annual requirements, and in fact a majority of the long term contracts, to which reference has been made, were on the basis of the average price paid by the Railway Board for the year for coal of similar quality. Figures indicate that the lower the price of coal fell, the smaller was the difference in price between the best and inferior coals, and that there was, therefore, an increasing tendency on a falling market to concentrate production on the best coals. It may, however, be pointed out that the lower the f.o.r. colliery price, the higher was the incidence of rail freight to destination in the over all cost to the consumer, and, so, geographical considerations of a lesser rail frieght to destination were in fact resulting before the war in some degree of zonal distribution, as evidenced by the steady increase in importance of the Pench Valley field.

Pre-war Distribution.

3. Distribution, so far as the large colliery groups were concerned, was principally by direct sale from the coal company to the consumer, but agents were used in all parts and middlemen, generally acting as principals, were used for business where the *del credere* risk was considerable. Brokers were also employed in many cases and remunerated by a small commission on sales which was paid by the coal company. Small collieries, without a proper selling organisation of their own, were largely dependent on whatever share they might obtain of the railway contract, and operated through middlemen or brokers for the balance of their output. The system in the context of ample coal available generally had the advantage of maintaining

close contact between sellers and buyers, in which the latter were able to make their preferences and complaints known, and also of ensuring that sellers made every effort to keep their buyers satisfied not only as regards quality but also as regards the sizing of the particular class of coal supplied.

Pre-war Transport.

4. The coastwise shipment trade through the Port of Calcutta consisted of about 1½ million tons of coal annually, and while this was not a large percentage of the country's requirements of coal, the trade was of very considerable assistance to the country's transportation system as it relieved the railways of the long haul to the seaboard of Southern and Western India. The balance of the country's coal requirements was carried by the railways, generally speaking without difficulty, except during the early months of the year, when the peak production of coal unfortunately coincided with the peak movement of agricultural traffic. This was an annual phenomenon and the railways, despite their best efforts, have proved unable to cope with it ; and it is, we think, this particular annual difficulty which has occasioned the longstanding complaint that the coal industry is handicapped by the inability of the railways to carry all the coal traffic offering.

5. In times of shortage, wagons for coal were allotted under the advice of two officers of the Railway Board, the Chief Mining Engineer and the Transport Advisory Officer. The following requirements had priority :

A Admiralty and shipment coal.

B Loco coal

C Coal required on military and Government account

D Requirements of public utility concerns

E Requirements of Iron and Steel works

F Requirements of coke ovens

The Chief Mining Engineer was responsible for the supply of programmes for A to C and the Transport Advisory Officer adv sed the railways in regard to the allotment of wagons for D to F. Wagons for public coal were, when available, distributed on a *pro rata* basis on indents received from collieries. The Transport Advisory Officer was also responsible for ensuring that—

(*a*) wagons to priority consumers were not supplied in excess of their requirements, and

(*b*) wagons moved freely from the coalfields and at the ports.

There was in addition a Coal Wagon Supply Committee, consisting of the Chief Mining Engineer and his Personal Assistant, the Transport Advisory Officer, one representative each of the East Indian and Bengal Nagpur Railways and two representatives each of the three principal Mining Associations. The functions of this Committee were to consider—

(*a*) applications from consumers for inclusion in the priority list (*vide* A to F above), and

(*b*) representations from colliery owners about the fixation of their wagon basis.

The Indian Coal Committee, 1925, were against any priority system in the allocation of wagons except in respect of A to C, but the system persisted.

6. We may here digress to consider the other recommendations of the Committee based on recommendations made by the Coal Traffic Conference of 1912. Their principal findings and recommendations were—

(*i*) that wagon supply should be improved to meet all the demands of the collieries particularly in the first half of the year,

(*ii*) that the difficult sections between Bandel and Naihati should be avoided as far as possible and that a bridge should be constructed at Bally for the use of the East Indian and Bengal Nagpur Railways, and

(*iii*) that the ten hour system should be extended on the East Indian Railway and introduced on the Bengal Nagpur Railway, that wagons should be supplied at regular hours, and that the allot ment should be on the basis of wagons at hand or actually in sight.

7. Other recommendations were an increased installation of private weigh-bridges, despatch of coal in full train-loads for steamers, elimination of unnecessary check stations in order to speed up traffic, a restoration of the freight-to-pay system, introduction of a system of indenting for wagons and the avoidance of delays in dealing with applications for new sidings.

8. It is to the credit of the railways that they proceeded to carry out many of these recommendations. Up to 1939, there was a progressive improvement in wagon supply, particularly on the Bengal Nagpur Railway. The Willingdon Bridge has been operating for over 18 years. The East Indian Railway increased the carrying capacity on the lines from Asansol to Calcutta. With regard to the supply of empties, the Committee's suggestion was adopted and the railways were working on a system of a pocket of empties equal to 50% of daily requirements, and every effort was made to give supplies of wagons at regular intervals.

9 We have dealt elsewhere with the ten-hour system, installation of private weighbridges and delays in dealing with applications for new sidings.

10. To sum up the pre-war position, it may, we think, be said that, on the whole, the railways were discharging the task of carrying the country's coal traffic with a fair measure of success, subject always to difficulties caused by the peak period in the early months of the year. It is very difficult for us to give an opinion on this particular difficulty, since the issue is whether the country's transport is expected to equip itself to deal with a peak traffic experienced only during a limited period, in the knowledge that this means idle wagons for the remaining portion of the year. We have stated elsewhere that we think that the railways should, in future, be treated from the standpoint of national development, and not simply as a profit-making concern, and from this angle we presume they should be equipped to deal with peak traffic in future. But the financial considerations require careful investigation and a balance will have to be struck between them and the national interest.

War Time Developments.

11. In March 1942, war demands on rail transport became so heavy as to necessitate the introduction of priorities for the movement of all commodities by rail. As coal constituted 40% of the goods traffic on railways, it was decided that a better distribution of wagons for coal woulld be secured

if arrangements for their distribution were concentrated in the hands of a single officer who would act as both Controller of Coal Distribution and Transport Advisory Officer. In the former capacity he would regulate the supply of wagons having regard to the demand for and availability of wagons and in the latter capacity he would be responsible for their movement in accordance with the restrictions imposed by the various railways. An officer was accordingly appointed in March, 1942.

12. The Coal Control organisation thus started as an allied branch of the Railway's Priorities organisation. There was at that time no question of insufficiency of coal at pithead; transport was the limiting factor. With a view, therefore, to ensuring an equitable distribution of coal within the available, transport, the existing priority list was expanded to include a large number of other consumers also. The wagons available were distributed in order of the priorities fixed after taking into account—

(*a*) the stock position of the various consumers, and

(*b*) the recommendations of Central and Provincial Government departments or officers.

The priority list was, however, subject to qualification in order not to give full supplies to a consumer in a high class before those lower below were supplied with their minimum requirements. The Controller of Coal Distribution was also given powers under Defence of India Rule 81 to regulate the movement, transport, distribution or disposal of coal, including the power to modify the terms of any contract. With the complete control over coal loadings that now came into force, the practice of supplying wagons on public account on a *pro rata* basis was discontinued. An intricate system of daily allocations of wagons was evolved and details of it are given in Appendix XX. Throughout 1942 and the greater part of 1943, there was difficulty in securing the full quota of wagons in the Bengal and Bihar coalfields. Against a target of 2,800 to 3,000 wagons per day, a supply of 2,300 to 2,500 wagons was achieved, mainly due to the higher priority given to foodstuffs, war industries, etc. On the other hand, in the coalfields outside Bengal and Bihar, there was no shortage of wagons at any stage and loadings were uniformly below the wagon capacity available. This further accentuated the difficulties in the Bengal/Bihar fields. Another complicating factor was the diversion from the sea to the rail route, soon after the outbreak of the war, of practically all the coastwise coal trade. An approach to the Combined Shipping Adjustment Board for the allotment of more coastal shipping to India produced no result.

13. The increasing difficulties made a regular and periodic survey of the all-India coal position necessary and also emphasised the need for a more closely-knit organisation for the collection of information about supply and distribution. It was, therefore, decided to set up a Committee at Calcutta consisting of the Chief Inspector of Mines, the Chief Mining Engineer and the Controller of Coal Distribution. This Committee was to consider monthly—

(*a*) raisings, despatches and stock figures generally but with emphasis on railways and other important consumers,

(*b*) new industrial or war demands, and

(*c*) the wagon supply position.

A Committee was also set up in Delhi, consisting of the Chief Commissioner of Railways and Secretaries of the Labour and War Transport Departments, to consider the reports of the Calcutta Committee.

14. The instructions given earlier to the Controller of Coal Distribution to do all that was possible to build up loco coal stocks which were dangerously low to a 45 days' level (as against a much higher pre-war one) soon made it impossible to give adequate quantities of coal to industries. On occasions, even Defence requirements could not be met in full. The fact was that the total demand was far in excess of the available supply and it became apparent that, in order to prevent grave shortages and shut-downs in industry, some form of coal rationing would have to be introduced. The basis of this rationing was "to establish definitely the total quantity of coal which could be raised and delivered and then to make quite sure that not more than this was allotted." After due consideration, a combined daily loading of 2,700 wagons in the Bengal and Bihar fields was adopted as a suitable figure on which to base the rationing scheme. This meant a despatch of 20,892,000 tons per annum from these fields and this, with the estimated despatchable coal from other fields (other than Assam, Punjab and Baluchistan), made a total of 25·64 million tons per annum available for allocation. Rations were fixed for various consumers on the basis of actual supplies made over a 12 months' period and took into account estimated increases in the consumption of essential services. This rationing scheme was approved in October, 1943, but shortly thereafter a heavy fall in raisings in the Bengal Bihar fields set in. *Ad hoc* monthly allocations based on the estimate of coal available had, therefore, to be made for the various classes of consumers. These allocations were made at monthly meetings of the Central Priorities Committee in Delhi. The system is still in force, though the work has been entrusted to a smaller sub-committee presided over by the Secretary, Department of Industries & Supplies. The experience latterly has been that, while raisings plus stocks are generally adequate to meet the full essential demand, rail transport is a continuing bottleneck.

15. In the preceding paragraphs we have discussed how, under the stress of war conditions, Government came to exercise almost complete control over the distribution and transport of coal. These drastic measures were necessitated by a heavy decline in the output and by an equally large shrinkage in the transport available to move even the reduced output. The control system was evolved gradually by the method of trial and error and a vast amount of statistical and other information was gradually accumulated concerning the requirements of the individual consumers throughout the country, the classes and the quantities of coal they needed, the routes by which the coal was delivered and the channels through which the orders were placed. Not only was there an over-all reduction in the output of coal but the decline in the output of good quality coal was proportionately greater. Government had, therefore, to re-distribute the available quantities of coal to the different consumers by broadly deciding the grades of coal with which they could make do. This necessitated fixation of prices and over-riding of all private contractual arrangements. Without such an encroachment on the freedom of individuals to buy what they liked and at the price they liked, coal prices would have risen to extraordinary heights, as they did for a while, and the principal industries of the country and the transportation system would have collapsed with disastrous consequences. The coal control enabled the country

to pass through most serious times and to survive. We have stated elsewhere that the majority of the witnesses before us have asked for the continuance of the control system in some form or other until supply and demand are more balanced.

Conclusions And Recommendations.

(1) The sale and purchase of coal in pre-war days was a free market and consumers bought generally on considerations of price and quality. Quality was to some extent determined by the Grading Board's classifications but was more usually judged by the known quality of seams or collieries. Price generally followed the railways' purchase price.

(2) Distribution was principally by direct contract with the large consumers, and agents and middlemen were also used.

(3) Before the war the railways were, on the whole, discharging the task of carrying the country's coal traffic with a fair measure of success, except during the preiod of peak traffic in the early months of the year.

(4) The war-time control over distribution and prices helped the country to pass through critical ti mes. **There is general agreement, which we endorse, about the need for continuing control until supply and demand are balanced.**

CHAPTER XXII

THE PLANNING OF TRANSPORT

Introduction

We have already shown in earlier chapters what we estimate to be the requirements of coal throughout the country and for bunkers and exports. It has been stated that starting from the 1945 production figures, we should plan production and arrange for transport on the basis that an additional 1½ million tons of coal every year should be made available for consumption, so that the demand of 39 million tons will be met from 1956. It should be borne in mind that this figure of 39 million tons represents, in our opinion, the basic requirements. To this we must add at least 7% for colliery use to arrive at the correct production target. The production and transport of this large quantity require careful planning. In this chapter we tackle this extremely difficult, and, to some degree, hypothetical task. Our knowledge of the different coalfields is limited and a great deal of the development proposed by us is dependent on certain of our proposals being accepted by the Railway Board. These are not the only difficulties. We have been much handicapped by faulty statistical information. It is also the case that the proposed programme may require considerable modifications depending upon the authority which enforces it and upon the knowledge of the coalfields then available.

2. The period from 1940 to 1942 can be described as perhaps the best production period, so far, in the history of Indian coal production. The annual production during these years was well over 29 million tons for the whole of India. In 1940-41, British India produced just over 26 million tons, while the contribution of the Indian States was 3¼ million tons. The decline in output in British India really commenced in 1942, but it was more than made up by the increase in the output of Indian States. There was a considerable landslide in 1943 both in British India and in the Indian States but the decline was arrested to some extent in 1944 and by 1945 the output in British India was again over 26 million tons. The output in the Indian States, however, though better than in the two preceding years, remained considerably below the production in 1940-42. Such monthly figures as are available for 1946 indicate that the upward trend is being maintained.

3. The decline in output was arrested by Government taking drastic and energetic steps to augment production. They granted to the collieries considerable financial concessions, fixed prices of coal which not only covered the cost of production but brought to the coal-owners appreciable profits, found them extra machinery and spent considerable sums of money in importing new labour to make up partially for the mining labour that had disappeared. It is, therefore, for consideration whether we can count on this increase in production after the withdrawal of the war emergency concessions. In our opinion, the withdrawal of emergency concessions will not, by itself, materially affect production, provided the prices of coal are fixed at a reasonable figure for a period and energetic steps are taken by Government to provide necessary transport facilities. The question of the price of coal has been discussed in another chapter. Here we are concerned with the physical increase in production and the influence of transport on it.

Proposals For Production

4. Broadly speaking, the principal transport bottleneck is found in Jharia and Raniganj so far as production is concerned and at the various upcountry

centres so far as distribution is concerned. The transport situation, though tight in other coalfields, is not nearly so difficult as in Jharia and Raniganj. In certain coalfields there has been practically no difficulty. In certain others the difficulty is in getting the coal to the rail-head, but once the coal reaches the rail-head onward transport is readily available. In the subsequent paragraphs we will discuss the influence of transport both on production and distribution in very broad terms in the different coal producing Provinces and States.

Assam

5. The development of the Assam Coal fields has been limited because of difficult mining conditions and the high sulphur content of the coal During 1940-42 the average output was just over 250,000 tons. After a decline in 1943 it rose again to over 300,000 tons in 1945. We should not expect very much more than this from these fields immediately, but they could and should be worked up to produce about 400,000 tons by 1950 and 450,000 tons by 1952, By 1956 the output from all the coal mines in Assam, existing and new ones, should be about 600,000 tons. If, during this period of 10 years, our scientists succeed in finding a process for desulphurizing this coal, the output can be considerably augmented and the question of setting up a steel works in Assam considered.

Bihar

6. The Province of Bihar is the principal coal producing area of India at present. The total output in 1940 was 15¼ million tons and in 1941 and 1942 nearly 16 million tons. The bulk of this coal was produced from the Jharia coalfield which accounted for between 11¼ and over 12 million tons annually during these three years. But there were other important coal areas, such as Bokaro producing annually 2 million tons, the portion of the Raniganj field in Bihar with 1 million tons and Karanpura with ½ million tons As far as we can see, whatever be the measures of coal conservation, Bihar will continue to be the chief coal producing area of India for many years to come, and the bulk of the coal produced will have to come out of the Jharia, Bokaro and Karanpura coalfields. We estimate that it will not be possible to reduce the demand for Jharia coal until about 1952 ; in fact we are counting upon a steady 12 million tons being produced from this field till then. We are hoping that development in other fields during this period and increased production of other coals in the Jharia field will enable us to curtail the production of good coking coal from 1952 but by that time we also anticipate that at least one more steel works may be in production and the net reduction in the output of good coking coal may, therefore, not be excessive. We think that, even after the curtailment of the output of good coking coal, the Jharia coalfield should continue to produce about 10 million tons per annum.

7. We foresee during the next 10 years a considerable amount of development in the Bokaro field. The output at present is about 2 million tons, mainly from railway collieries. These collieries are working semi-coking coal and mining conditions, being largely open cast, are comparatively easy. The development of the field further west is dependent upon improved railway facilities and the provision of electric power. If work on both these can be undertaken simultaneously and completed with in 5 or 6 years from now, we can count on an additional 1½ to 2 million tons of coal annually. Since we attach considerable importance to the development of this field, we are of

the opinion that until development is complete the output of the railway collieries in this field should be stepped up to something like 3 to 3½ million tons This output can be brought down again as the development of West Bokaro is completed. but the total output from this field should be stabilised by 1956 at between 3½ to 4 million tons per annum.

8. The development of the Karanpura field is long overdue. This field contains enormous quantities of fairly good steam and semi-coking coals which may be suitable for washing. The deposits are estimated to be several thousand million tons. But the present output is less than a million tons per annum mainly because of the want of railway facilities. We consider that the development of the Karanpura and Bokaro fields should be treated by the railways as schemes of first priority. The output from the Karanpura field should be increased gradually to keep pace with the railway construction. We are hoping that by 1950 about 2 million tons of coal per annum will be produced from this field and 4 to 5 million tons per annum by 1956-57.

9. We are not in a position to criticise the plans which the Railway Board have in hand for the construction of new railways in the Bengal and Bihar coalfields areas. We have not examined these plans and we do not really know much about them. But we are concerned with the production and movement of coal and with this object in view we would like to make certain comments. Take, for instance, the new line which will link up Giridih, Hazaribagh Road and Hazaribagh itself but would stop short of the area where it is needed most, *viz.*, the Bokaro and Karanpura fields. We think that the line should be extended beyond Hazaribagh and further to meet the existing line near the spot where it will be crossed by the proposed Gaya-Ranchi loop. If need be, the extention may be in replacement of the section between Giridih and Hazaribagh Road for the time being. We attach considerable importance to this.

Similarly, we think that the proposed Gaya-Ranchi section has important possibilities and would certainly help open up the Karanpura field. We would, however, recommend that the construction of this line should start from the end where it crosses the existing line between Barkakhana and Burwadih. The development of the Karanpura field is of the utmost importance and will be made possible forthwith if work were to commence at that spot and then be extended to Gaya and Ranchi.

The conversion of the narrow gauge line between Purulia-Muri-Ranchi-Lohardaga is not very important from our point of view. It is, however, likely to be of use if, after Ranchi has been linked up with the Barkakhana-Burwadi section, the section between Ranchi-Lohardaga is first converted and eventually linked up with the proposed Burwadih-Birmitrapur section. Obviously at present neither the linking nor the conversion is of much use. It is only when the Burwadih-Birmitrapur section is completed that some of the Bokaro and Karanpura coals will find an easy outlet to the south.

10. In addition to the above, an attempt should be made to develop the output of some of the smaller fields, *viz.*, Jainti, Rajmahal and Daltonganj. Jainti field has been in production for some time. In 1940 it produced 45,000 tons of coal, though the output has been declining since and we are advised that there is little hope of getting more coal from this field.

The Rajmahal's output at present is very small—3 to 4 thousand tons a year. In 1944, however, it amounted to 16,000 tons. There is no reason why this coalfield should not produce something like 60,000 tons annually 1956.

Daltonganj (Palamau district) field has in the past produced appreciable quantities of coal. Its best effort was in 1908 when it produced as much as 90,000 tons, and for a considerable period it was producing over 70,000 tons. After the 1914-18 war, its decline set in and its output now is negligible. Because of its situation and other factors, we consider that the Daltonganj coalfield should be encouraged and the proposed railway link between Untari Road and Guruwa Road with Chirimiri would open for it an outlet to the west. We are hoping that this area will be able to produce 50,000 tons a year from 1950 and 150,000 tons a year by 1956.

11. So far as Giridih field is concerned, we are conscious of the fact that it is producing probably the best metallurgical coal in the country, but is nearly worked out. We do not see any possibility of bringing about a reduction of the demand on this field ; as a matter of fact we expect it to produce about 650,000 tons during the next few years.

12. We have dealt with the development possibilities of the Hutar field in Chapter XVIII ; suffice it here to say that we are expecting that this field will be able to make a substantial contribution from 1952, when the proposed new line between Burwadih and Birmitrapur is constructed. If work on the construction of this line starts at Burwadih, it will be of immediate assistance. Unfortunately, the proposed line, we believe, will merely touch the edge of the coalfield, but we trust that the railways will be willing to give the necessary fillip to the development of the Hutar field by providing necessary sidings.

13. The present output of the Bihar portion of the Raniganj field is just under a million tons and we see little possibility of its being increased.

Bengal

14. The Raniganj field in Bengal is the second principal coal producing area in India at present. In 1940 its output was over 9¼ million tons, but about 8½ million tons should be treated as a good average for this field. The field produces the best gas coal in India, and this coal is also high quality steam coal which is much sought after. The working conditions in the field are becoming difficult. Mines have become very deep, workings in some cases being over 2,000 ft. In a large group of mines, plans are under consideration for development up to 3,000 ft. We are assured that the quantity of coal in this particular area at that depth is substantial and, on the whole, there is no danger of exhaustion of the reserves with the same rapidity as those of the Jharia field. We are aware of the fact that Dishergarh coal will probably, in course of time, become the basis of hydrogenation and chemical industries. But we cannot at the present stage of development conserve both the Jharia and Raniganj coals. Since we have to choose between the two, we have chosen the Jharia field for essential conservation and we propose to divert some of the extra pressure caused by our schemes of conservation to the Raniganj field. In Raniganj, apart from the area that has been worked, there are still fairly substantial areas, *e.g.*, Kajora-Jambad-Samla, where for want of transport facilities and power little development has taken place. We would suggest that this area should be taken up for immediate development and necessary power and transport facilities provided. We are hoping that the owners in this field will make a particular effort to increase the output to about 9 million tons by the end of 1947, rising to 12 million tons by 1956.

15. The only other coalfield in Bengal is situated in the Darjeeling district near Bagrakot. This field is being worked only in a small way, mainly due to transportation difficulties. We are told that it contains good coking coal,

though, unfortunately, it is very friable. We suggest that the possibilities of development in this field should be examined, for even if the coal produced from it cannot be used for metallurgical purposes, there is no reason why it should not find some local use.

Central Provinces

16. The third most important coal producing province in India is the Central Provinces and Berar. The principal collieries of the Province are located in the Pench Valley. In 1940, the Pench Valley coalfield produced $1\frac{1}{2}$ million tons of coal and by 1942 output had passed this mark. There was however, a decline in 1943 and although some recovery was made in 1944, the output in 1945 was only 1,380,000 tons. The Pench Valley coalfield is one of the most important coalfields in India largely because of its situation. The coal produced by this field is extensively consumed by the G. I. P. and B. B. & C. I. Railways and also by the mills in Ahmedabad and Indore. Because of the freight advantage, coal from this field, although poorer in quality than the best Jharia and Raniganj coals, enjoys a premium so far as price is concerned. But the development of the field has been held up because of the lack of electric power and additional siding facilities. During the war, the Coal Commissioner prepared a scheme for the electrification of the mines situated in the Pench Valley, but no work has yet been started because it has not been found possible to bring about a settlement of the financial aspect of the question between the Central Government and the Provincial Government. The development of this field will play a vital part in the industrialisation of the country and will be largely responsible for checking the trend visible in western India to substitute fuel oil for coal. The coal is there ; what is required is to get it out. We would, therefore, suggest that the Provincial Government should undertake to supply electric power to these collieries at a very early date and would ask the railways to give up arguing whether the sidings which some of the new projects require, should be built on Assisted Siding terms or as branch lines. Since the railways themselves are unable to move all the coal produced in the Jharia and the Raniganj fields, and since development of the Pench Valley coalfield is in their interests, they should now undertake the construction of the branch lines with the necessary sidings without further waste of time. If this is done, there is no reason why the field should not be producing about $2\frac{1}{2}$ million tons by 1956.

17. So far as the coalfields in the Wardha Valley are concerned, their output is equally important and there is no reason why the collieries there should not increase their output appreciably. Even at a modest estimate they should produce about 275,000 tons annually by 1950. In 1940 their output was about 256,000 tons and there have been periods when they have done over 300,000 tons. We are hoping that these collieries will be so developed that by 1956 they will be producing $\frac{1}{2}$ million tons of coal annually.

18. The collieries in the Yeotmal District, *viz.*, Ghugus and Rajur, have also suffered from declining output in recent years. In 1941 their output was 75,000 tons, but by 1945, it had declined to 25,000 tons. The output of the collieries should be stepped up, so that in 1950, if not earlier, they regain their previous peak output and by 1954 to 1956 double it.

19. Before we pass on to the question of coal production in the Indian States and the measures to be taken to augment it, we may dispose of the remaining British Indian Provinces which produce coal. The first in importance is the Punjab. It has two principal areas, *viz*, the Dandot group and the

Makerwal group. The Dandot area was at one time worked by the North Western Railway but has now been abandoned by them, though some coal is still being produced. The Makerwal group is the more productive. The coal from both these fields is of poor quality, friable, with a high sulphur content. It is principally used for brick-burning but substantial quantities are also used by the cement factory at Wah.

In 1940, the Punjab group of collieries produced nearly 200,000 tons of coal but by 1943 the output had declined to half the quantity. Since then it is showing a tendency to improve, though somewhat erratically. Punjab coal has a limited range barely a radius of 200 miles, and cannot even compete in the Lahore market with Bihar coal without being given special assistance. Until a method of desulphurising this coal has been discovered—and this matter is receiving some attention at the hands of the Punjab Government—we cannot expect any substantial contribution from the Punjab fields. The working conditions in the mines are extremely difficult and the workmen, who are largely recruited from the independent tribal area, are difficult to deal with. But we are hoping that by 1950 these collieries will reach a steady output of 200,000 tons and go up to about 250,000 tons by 1956. If, within the next 10 years, a method of desulphurising coal is found, it is possible that some of the Punjab coal might be utilised by the railways. So far as the collieries are concerned their main problem is to get the coal to rail-head. Thereafter there is no shortage of wagons, though the collieries would like to have a revision of freight rates and certain other facilities.

20. During the war the output of coal in Baluchistan showed an appreciable improvement. The coal in Baluchistan is worked from four different groups of collieries, the principal one being at Mach. Baluchistan coal is of the same quality as the Punjab coal—friable with high sulphur content. Working conditions are even more difficult than in the Punjab.

One of their coalfields, which is actually situated in the Kalat State, is nearly 6,000 ft. above the sea level and the coal has to be brought down on pack animals or by manual labour. During the war a briquetting plant to make use of Baluchistan coal has been installed. There was already in existence a small somewhat antiquated briquetting plant with rather low output, which is now no longer used. The cost of making briquettes is very high and although briquetted coal has found a ready market as domestic fuel, etc., its cost is prohibitive for industrial pruposes. Once the coal has reached rail-head there is little difficulty in finding wagons. If a market can be assured, and we feel that the producers will continue to have this while the shortage of coal and transport throughout the country lasts and even thereafter, we see no reason why Baluchistan, at the present rate of progress, should not be able to achieve and maintain an annual production of $\frac{1}{4}$ million tons.

Sind

21. The output in Sind is negligible. In 1945 it was the record figure of 11,000 tons. There should be a demand for this coal for brick-burning purposes and we may leave it at that.

Orissa

22. The Hinger-Rampur coalfield in Orissa has two collieries working and their best output so far has been 147,000 tons in 1942. In 1945 it was only 123,000 tons. These collieries are working in a large coalfield situated on the main Bengal Nagpur line to Nagpur. There is room for development and the

opening of new collieries. This should be investigated. The output from these collieries could probably be gradually doubled in the next 7 or 8 years. The big problem there is of water : and the coal is inferior.

Indian States

23. Now we come to the coalfields situated in Indian States. Let us begin with Korea and Rewa. These States contain some very valuable deposits of coal, both developed and undeveloped. In this chapter we will confine ourselves only to the areas which require further development and not the new areas which have been dealt with elsewhere.

24. *Korea State.* The principal collieries in this coalfield are Chirimiri, Kurasia and the two Jhagrakhand collieries. Ponri Hill colliery is also becoming important; it is at present being worked by the Central Government, and if everything goes according to plan, it should, within the next two or three years, become as imporant as any in that area. These collieries were producing over a million tons of coal within a few years of being opened up. In 1940, their output was 1,131,000 tons and continued to rise until by 1942 it was over 1¼ million tons. The coal is good steam coal which leaves very little ash and does not clinker. The railway witnesses whom we examined spoke highly of this coal ; it can be and has been used successfully even for mail services by one railway. The field contains enormous quantities of coal and despite the curious configuration of the land, development of the area is proceeding apace ; powerful industrial interests have acquired large concessions and as soon as the link between Burwadih and Untara Road and Chirimiri is completed, there should be a tremendous rise in output in this field. We are hoping that by 1950, with the development now in hand and projected, these collieries will be producing about 1,800,000 tons of coal annually and that by 1956, when we anticipate the railway link will be completed, there will be no difficulty in producing 2,500,000 tons of coal annually. We would, however, recommend that the construction of the sidings projected by the railways as well as the main link should start from the Chirimiri end so that any section completed may be of immediate assistance to the coalfield.

25. *Rewa State.* The principal collieries in the Rewa State are Umaria, Birsinghpur, Johilla, Burhar and Kotma. Between them they have been producing about 350,000 to 400,000 tons of coal per annum. Considerable development work is already in hand and we expect that, as a result, the output from these collieries and the coalfields will continue to rise. We should not be surprised if, given the necessary assistance in the way of transport, an output of a million tons is reached by 1956.

26. *Hyderabad State.* The collieries in Hyderabad State have been in the past substantial producers of coal. The best known of the Hyderabad State collieries, *viz.*, Singareni, has now been exhausted, but two others, Tandur and Kothagudium, are working with an output of just over 1 million tons per annum. The working conditions in Kothagudium particularly are difficult due to water bearing, undulating and faulty strata, and there is a difference of opinion as to whether these collieries can be mechanised. Experiments have been made with results which appear to be unfavourable to coal-cutting machines and mechanical loaders. We know that the State is very anxious to develop this field and if conditions are found favourable they will aim at doubling the present output. We have based our estimate, however, on a possible output of 1½ million tons per annum by 1950 and an increase to 1¾ million tons per annum by 1956.

Hyderabad State has in the past been an important source of coal supply to the Madras and Southern Mahratta and Nizam's State Railways, and an increase in the output of the coalfields in the State is most desirable. Fortunately, the Nizam's State Railway is in a postion to handle all the coal traffic offering, though once the coal leaves State territory there are a number of bottlenecks on the on-carrying railways.

27. *Talcher State.* Three collieries are at present being worked in Talcher State, two by the railways and one by a private company. The highest output so far was in 1941, about 512,000 tons. The coal from these collieries is used by the Madras and Southern Mahratta Railway and others. It is good steam coal with fairly low ash content but somewhat high moisture.* The possibility of increasing the output from the existing collieries is somewhat limited, but there are suitable areas adjoining the existing collieries which could be developed and made to yield substantial quantities. Difficulties in obtaining leases of these areas have been reported to us but we hope that this matter will be straightened out with the assistance of the Rajah, who is keenly interested in the development of the State. At least one more colliery should be opened in this area and we hope that this will be done and that by 1956 the area will be producing about $\frac{3}{4}$ million tons of coal annually. The Railway Board are thinking of linking Talcher with Koelbank on the Bengal Nagpur line. If this materialises, it is possible that other collieries will be opened in the State. The line is likely to pass through an area which contains very thick seams but of rather inferior coal.

28. *Raigarh State.* Very small quantities of coal are being produced in this State but it has possibilities which should be explored. From the size of the deposits, etc., it should not be difficult for the State to augment its output to 50,000 tons in the next 10 years.

29. *Bikaner State.* This State has an important lignite deposit which is being worked by the State itself and produces nearly 50,000 tons annually. The State is anxious to develop it, but we understand that the possibilities of development are limited. The lignite produced is of poor quality and has more or less been confined to local use. We do not see any reason, however, why the present output should not be maintained during the next 10 years.

Transport Requirements.

30. Leaving out of consideration for the time being the coal that is likely to be produced in Assam, Punjab, Baluchistan, Sind and Hyderabad State, which will probably find all the transport it requires during the next 10 years, we have to consider the effect of the increased production of coal on the transport situation in the central area. The bulk of India's coal requirements will have to be moved from Bengal/Bihar and transport is a big problem.

31. There was recently a meeting between the Railway Board and the representatives of the coal trade and in the memorandum which the trade presented to the Board, they asked how it was proposed to move about $27\frac{1}{2}$ million tons per annum from the Bengal and Bihar coalfields when the railways are unable to handle even the present traffic. In reply the Board stated that although the military load that the railways had to carry was still fairly heavy, there had been an appreciable improvement in coal loadings in the first 9 months of 1945-46 as compared with the corresponding months of 1944-45. In the period October 1945 to June 1946, the total number of coal wagons loaded in the Bengal and Bihar coalfields by the East Indian and Bengal Nagpur Railways was 757,739 as compared with 696,305 wagons in the corresponding period of 1944-45. They went on to say that the trade should bear in mind

that after a period of tension and strain lasting for over 5 years, it is natural that reversion to normal working could not be a matter of a few weeks or months. While admitting that there were additional track and other facilities in existence now, the Board pointed out that these facilities were planned in connection with war movements; peace-time requirements are different, and in many cases facilities are now not available at the spot they are needed. In the written evidence submitted to us the Railway Board have stated as follows :—

"Before dealing with paras. 13 to 30, the Railway Board wish to make one point quite clear. Question No. 13 refers to the 'All-India requirements *for the next two years*' and asks whether railways will be able to cope with this movement and if not, what measures are to be taken. Railways are only now beginningto rehabilitate themselves. Without going into unnecessary details, it is desirable to explain that arrears accumulated during war-time in maintenance of permanent-way and of engines and rolling stock, the shortage of essential stores, and fully trained staff must all be overtaken and overcome, before railway operation once more becomes normal.

"The estimate of potential achievements which follow can only be on the assumption that normality has been achieved. There is, of course, the all important question of revision of pay of Government servants which is shortly to be examined by a special Committee. It may take two years or more before rehabilitation in all its aspects has progressed sufficiently to permit of a substantial semblance of normal working. Contentment among all grades of staff, the elimination of post-war weariness and a revival of energy are pre-requisite.

"The provision of facilities designed to deal with this increased movement of coal is in hand and progressing satisfactorily. Brief details are given in reply to question No. 13. No practical benefit, however, can result from an endeavour to link their phased progress to phases of increased movements. The physical completion of the works now in hand will be but one facet of the problem which will not be solved till railways are sufficiently 'normal' to make full use of facilities provided.

"It may be taken, therefore, that our estimate of potential capacity is relative to the position as we hope it will be in two years' time.

'Part IV—Question 13.

"The movement of about 28 million tons from Bengal and Bihar coalfields will mean an average daily loading of approximately 3,700 wagons per day. It is not anticipated that this daily average could be achieved for at least two years.

"Its achievement at the end of that time will depend on a variety of factors not the least of which will be the necessary evening out of the daily average loading to prevent mid-week concentration and week-end slumps. It is recommended that the future coal organisation should aim at this aspect of coal loading and the remarks which follow are on this basis.

"The B. N. will, we estimate, have wagons, track, power, siding, pilot and depot facilities to deal with a daily average of 1,200 per day. On this basis they will be able to move out of the Bengal and Bihar fields 9·285 million tons per annum, *i.e.*, about 1/3rd of the estimated despatches from Bengal and Bihar fields.

"They should be able to augment this figure by another 200 wagons per day provided that these are for the Calcutta area and *via* thereby raising their total capacity to 1,400 per day

"This is on the assumption that the coal traffic conforms approximately to the following routing :—

		Wagons
B.N.R. . .	East of Kharagpur	425
B.N.R. . .	South of Kharagpur *via* Waltair	100
B.N.R. . .	Beyond Chakardharpore including *via* Nagpur and *via* Katni/ Marwara	260
B.N.R. . .	Local	350
	Wagons to the E.I.R. *via* Gomoh	150
	Wagons to the E.I.R. *via* Asansol	75
	Wagons to the E.I.R. through the coalfield Exchange Links .	40
	Total . .	1,400

"Assuming an average daily loading of 1,400 per day by the B. N. Railway, which is equivalent to 10·833 million tons per annum, the E. I. Railway will be left to move 17·2 million tons per annum or 2,300 wagons per day in a working year.

NOTE:—If, however, the actual working year were to be of 300 days only this would mean a daily average loading of 2,720, which approximates to the present depot and pilots capacity but is in excess of the estimated clearance caacpity in two years' time of 2600, divided as follows :

Upcountry 1400. Downcountry 950 (could be increased) and 250 Industrial area.

"The capacity of the E. I. to clear traffic from the coalfields depends largely on the destinations. The 'Downcountry' clearances capacity is adequate for any probable requirements. The facilities for Upcountry clearances are severely taxed under the present abnormal conditions while the power situation is in an unsatisfactory state as a result of wartime conditions, and while the efficiency of staff is at a low ebb engendered by general discontent on account of cut in food rations, and uncertainty as to future prospects of pay. On the assumption that of the total traffic 1,400 would be for upcountry, when conditions have assumed normality, it will be possible to deal with this number on completion of additional facilities now in hand :

"(*a*) increased facilities at Barkakhana and on the Burwadih-Sone East Bank Loop Line ;

(*b*) conversion of back shunting siding into passing loops on the Allahabad Division ;

(*c*) completion of doubling between Lucknow-Bareilly ;

(*d*) improvements on the main line—Sitarampore, Jhajha and Moghalserai ;

(*e*) improvements in Moghalserai Yard ;

(*f*) the provision of additional shunting power in Moghalserai.

NOTE: Power for this purpose will be available.

" The rebuilding of the Dufferin Bridge will continue to be a serious handicap to operation for some time.

" There are a few points outside Bengal and Bihar but on the main coal routes, which may require the provision of additional facilities such as Katni and Ajni and the transhipment arrangements at Agra East Bank. These are now under investigation.

" The actual usage of the various movement potentials dealt with in the preceding paragraphs will, to an extent, depend upon the relative production of despatchable coal not only from various fields but also from section by section of these fields. The Committee are doubtless compiling estimates of production broken down by sections of the various fields and the Railway Board would be glad to receive this information when complete, to review the effect thereof, on the distribution by the different routes of which the capacities have been given.

" This brings us to the general question of wagon availability. The loading of 3,700 per day in Bengal and Bihar plus say another 600 in other fields, excluding Assam, Punjab and Baluchistan, at a 12 day turn-round will mean that approximately 51,600 wagons of our total stock will be continually under load with coal traffic against approximately 40,000 at the present time, *i.e.*, an increase of between 11 and 12 thousand per day. Of the total of 19,290 wagons to be imported from overseas, 4,700 are now in service leaving a balance of 14,590 which will be put into service during the course of the year, supplemented by indigenous production which by the end of 1947 should total another 5,400.

" It is to be remembered, however, that this additional B.G. traffic will be spread over 33,000 track miles and if traffic other than coal continues to offer at its present high level, coal loading will possibly require their high priority to continue."

32. We have quoted at length from the Railway Board's reply in view of the importance of the matter. We regret, however, that we are not fully convinced that the railways will be able to move the traffic. They have shown that they can move about 28 million tons from the Bengal and Bihar coalfields by an average daily loading of approximately 3,700 wagons, and have cautioned us that this daily average cannot be achieved for at least 2 years. We suspect that even after two years it is most unlikely that this average will be reached, as it represents practically the railways' maximum loading capacity so far as coal is concerned. Any reduction in the number of wagons to be loaded will result in a curtailment of the programme of supplies, as there is no hope of the railways making up the arrears in addition to keeping up their daily programme. From October 1944 to the end of June 1946, the best loading month on the East Indian Railway was October 1945. During that month, on an average, 2,024 coal wagons were loaded per day by the railway. The Bengal Nagpur Railway's best effort was in April 1946, when they loaded, on an average, 946 wagons per day. In the past the railways have moved well below 25 million tons annually from he Bengal and Bihar fields and we do not see how they can, without considerable alterations and additions to their services and at the expense of other traffic, undertake the movement of 28 million tons of

coal in 1947. In this connection the statement below giving figures of coal and other traffic (all sections) will be of interest :—

(In million tons)

	1939–40	1940–41	1941–42	1942-43	1943–44
Coal					
East Indian Railway	15·4	15·4	15·5	13 3	13·6
Bengal Nagpur Railway	9·7	9·9	10·1	8·8	8·3
Total Coal	25·1	25·3	25·6	22·1	21·9
Other Goods Traffic					
East Indian Railway	13·2	14·1	14·0	13·4	13·1
Bengal Nagpur Railway	10·5	10·7	11·2	11·1	10·6
Total	23·7	24·8	25·2	24·5	23·7

The situation is likely to be made more difficult by the fact that the collieries consider only a 6-day loading week as practicable. This would reduce the actual working year to about 300 days and on the East Indian Railway a daily loading average of 2,720 wagons would be needed to complete the annual programme. Daily loadings on the Bengal Nagpur Railway, too, would have to be increased if that railway are to carry the coal estimated.

33. This is not all. Even after coal has been loaded from Jharia and Raniganj, it is held up at various bottlenecks upcountry which require additional facilities. We note, in respect of the bottlenecks at Katni, Ajni and Agra East Bank, that " these are now under investigation " but what is required is prompt action ; these bottlenecks have been known to the railways for many years.

34. Fortunately, it seems that both the East Indian and the Bengal Nagpur Railways have got at present sufficient Depot and Pilot facilities. For example, it is stated that the total existing Depot capacity on the East Indian Railway is 3,500 wagons and the pilot capacity is 4,400 wagons. These can conveniently handle over 17 million tons of coal, which would be the share of the East Indian Railway on the basis of 28 million tons required from the Bengal/Bihar colfields. The Railway Board themselves admit that the difficulty is not the Depot or Pilot capacity but the clearance capacity above the coalfields, especially above Moghalserai, which is receiving attention. They further state that Katras has been reopened as a Depot station, giving an additional capacity of 300 wagons, and that re-modelling of Barkakhana is in hand. Extensive re-modelling schemes are also being carried out in other Depots such as Ondal, Asansol and Dhanbad which would facilitate better movement of wagons.

35. With regard to loading capacity above Moghalserai, the Railway Board admit considerable restrictions, but point out in extenuation that there has been a substantial increase in the coal traffic moving above Moghalserai on account of the difficulties in coastwise shipping. They state that the Railway Administration are fully alive to the needs of the coal traffic above Moghalserai and that extensive schemes are in hand by way of doubling the Dufferin Bridge at Benares, doubling the line between Lucknow and Bareilly, and re-modelling the stations and marshalling yards on the two main routes from Moghalserai to Ghaziabad and Moghalserai to Saharanpur. As these

works are completed, there will be a progressive improvement, and, in due course, the East Indian Railway will be in a position to handle coal on the above Moghalserai route to the extent of 1,200 wagons per day, which should cover the present and possibly future requirements of the country. The Railway Board point out that the Bombay, Baroda and Central India Railway are also taking in hand transhipment facilities at Agra East Bank.

36. All this may sound very reassuring ; but we fear that before these improvements materialise, they will already have become inadequate owing to the increased traffic all round, including coal traffic. The railways seem to be suffering from ' operational fatigue ' and require—on the statement of the Railway Board themselves—two years to recuperate and refresh themselves before they can return to ' normal ' standards. We have to emphasise that even the ' normal ' standard now represents a totally inadequate standard. The railways may just be able to handle 28 million tons in two years' time, but the demand for coal on the Central area should keep on mounting until it reaches a figure of over 30 million tons within the next few years. We see no prospect of the present railway system being in a position to meet this traffic without a complete and thorough overhaul ; in fact, the present railway system is becoming a mill-stone round the neck of the country. We would, therefore, urge Government to appoint a high-powered Committee forthwith to go into the whole question of transport and to plan for the movement of this coal and other traffic ; otherwise, the country's efforts towards increased industrialisation will find themselves strangulated.

37. We would like to say that the railways are undoubtedly making an effort to meet the growing demand. But their capacity is limited. They have in the past been victims of an incorrect policy, *viz.*, the attempt to run the transportation system of a country, which is in the process of development, as a ' commercial enterprise '. What is required is to revise completely our fundamental ideas of railway development, so that instead of being treated as an end in themselves the railways are treated as a means to an end.

38. In the previous paragraphs we have made proposals for new construction here and there. Now we wish to make several important suggestions which will, in our opinion, relieve the pressure on the broad-gauge system in the coalfields. The Railway Board would, we think, be the first to admit frankly that the entire broad-gauge system requries to be overhauled. There are many bottlenecks and over vast sections line capacity has been reached. There are two ways of dealing with the situation—one is by renovating the existing system and increasing its capacity and the other is by constructing alternative lines which will divert some of the traffic from the main overcrowded routes.

The first suggestion we wish to make is in respect of an extension of the metre gauge system to the coalfields. India has a net-work of metre-gauge sections, but curiously the North-Indian section has not been linked with the South-Indian section. The Railway Board have now decided to extend the line from Khandwa across the Satpuras to Akola and through Southern Berar to meet the Nizam's State Railways' metre-gauge system at Hingoli. The line between Khandwa and Akola will pass within 70 or 80 miles of the Pench Valley coalfield. The deposits in the undeveloped areas in the Betul District to which reference has been made in Chapter XVIII will be closer still. We are of the opinion that a branch line should be constructed from the Khandwa-Akola section to go through the undeveloped coalfields of Betul and on to the Pench Valley. The extra traffic will presumably necessitate doubling of the line between Khandwa and Ujjain. It is an extremely difficult track but we believe that such doubling will become necessary even without the additional

coal traffic. The advantage of this system would be that large quantities of Central Provinces coal, which are consumed in Ahmedabad and other centres in Gujrat and Indore, will be taken by the metre-guage system direct from the coalfields ; and there will be substantial relief to the broad-gauge system. The Bhopal-Itarsi section is becoming extremely difficult and Ujjain is finding it difficult to handle the large quantities of coal which are received for transhipment. These sections will get an appreciable amount of relief under our proposal.

39. Another suggestion is in connection with the Bengal and Bihar fields We are given to understand that the railways are thinking of building a metre-gauge bridge across the Ganges in Bihar either near Patna or Mokameh Ghat. We suggest that when the bridge is constructed, a metre-gauge line should be laid on to connect the system with all the four important coalfields in Bengal and Bihar, *viz.*, Raniganj, Jharia, Bokaro and Karanpura. If this is done, it will not only be of material assistance in the opening of the Bokaro and Karanpura fields, to say nothing of the undeveloped sections of the Raniganj and Jharia fields, but will also bring substantial relief to the broad-gauge section, to the transhipment of coal above Moghalserai, and to Mokameh Ghat. The importance of this connection cannot be overestimated. A theory of much interest is that this metre-gauge section should be extended westwards from Karanpura to across the Surguja and the Central India coalfields to meet the Pench Valley metre-gauge system. This will not only entail construction of large sections through very difficult country but will probably involve the scrapping of the entire narrow-gauge system in the Central Provinces. That system is becoming an anachronism anyhow and will have to be replaced one day, and our idea is that when that time comes, it should be replaced by a metre-gauge system. But this is for the future. The other two metre-gauge projects are urgent.

40. We think that a new broad-gauge line should be constructed from Manikpur through Singrauli coalfield to meet the Burwadih-Chirimiri section at a suitable point. We are making this suggestion for three reasons :—

(*i*) the Manikpur-Jhansi section is at present lightly worked and can take more traffic for Northern (and later Western) India ;

(*ii*) the construction of this line will relieve pressure on the track above Moghalserai as well as on Katni, and

(*iii*) it will encourage the development of the Singrauli coalfield which is one of the most extensive coalfields in India covering an area of 900 sq. miles. Moreover, the coalfield is nearest to Northern India, and, once it is connected by railway, will have a freight advantage over the Jharia and Raniganj coalfields and may be able to relieve the pressure on them.

In due course the line can be extended to link up with the branch suggested by us from Champa to Korba. When this is done, most of the important coalfields in India will have been opened up and served by railways and there will be alternative routes for serving Northern and Southern India. We should take a long view in these matters and should now provide for the extra traffic which would be offering as a result of the proposed linking between Karachi and Bombay. The Central India, Singrauli and other Rewa and Pench Valley coalfields will be brought closer to Karachi by this new connection and the Railways can hope for appreciable coal traffic to the north. The strategic advantages of providing the metre-gauge system with a direct approach to the coalfields are obvious.

41. In the subsequent paragraphs we shall discuss a few general measures which, if adopted by the Railway Board, will, in our opinion, be of assistance to the coal industry and will also encourage the free flow of traffic.

Zonal Distribution.

42. In view of the shortage of transport, it is imperative that increased attention be given to the zonal distribution of coal. Western, Central and Southern India will be served mainly by the Central India, Central Provinces and Hyderabad State coalfields. The rest of the country will have to depend mainly on the Bengal and Bihar coalfields, except a limited area where the local provincial coalfields are within easy reach. We do not propose to attempt to allocate definitely different tracts to the different coalfields. There is a danger in this ; all the coalfields do not produce coal of the same standard quality, and since good quality coal is necessary for some consumers, the programme of distribution on a ' zonal ' basis will have to be very carefully worked out and linked up, so far as possible with the present control over the distribution of coal.

Siding Arrangements

43. A great deal of evidence has been produced before us to show that new sidings and extensions of existing sidings, which, at the best of times before the war, were granted after considerable delays, are now only obtained with the utmost difficulty. In some cases this is due to the conditions created by the war, *viz.*, shortage of material and shortage of labour. But the attitude of the railways in this matter is far from reasonable. We suppose it could be argued that their attitude is logical—more sidings would mean more coal, and since the railways are finding it extremely difficult to move even the coal that is being produced now, they do not see why they should grant further sidings and add to their difficulties. The Railway Board in their evidence have suggested that future applications for colliery sidings should be submitted to them properly screened by the Department of the Government of India in charge of coal. They also insist that no application should be entertained from concerns unable to offer a minimum quantity of at least 5,000 tons of coal per month and that facilities for railway working, such as weigh-bridges and sufficiency of stabling accommodation for empty and loaded wagons and for preliminary sorting, should be provided. They go on to say that if these conditions are made the pre-requisites to the provision of assisted sidings, railway transport will be in a position to move substantially more coal even with the present wagon and power stocks. These should certainly be provided where possible, but we are also of the opinion that the Railway Board should insist that the railways concerned should move with more expedition in these matters. We have one case before us in which a colliery, which is producing over 5,000 tons of coal now and is capable of producing 20,000 tons a month, has not been given a siding though the total length of it will be only 2½ miles. We endorse the suggestion made by the Railway Board that in future an application for a siding should be screened by a central organisation. This will eliminate a number of applications from collieries which for size or other reasons cannot be provided with sidings.

The 10-hour System

44. The Indian Coal Committee, 1925, had recommended the general introduction of the 10-hour system of supplying wagons to collieries. This recommendation has not yet been adopted and there is no uniform system of supplying wagons to collieries. The East Indian Railway in some case

have adopted the 10-hour loading system, while the Bengal Nagpur Railway still follow the 20-hour loading system. The 10-hour system was recommended in the hope that it would result in a quick trun-round of wagons and also probably because of the limited capacity of sidings to cope with full rake loading. The Indian Mining Association have in their evidence suggested a 12-hour system under which the empties will be placed at 8 A.M. and 8 P.M., but they will not insist upon it provided the railways make wagons available for full 24-hour working.

The Railway Board are not in favour of the introduction of the 10 or 12-hour system, as it introduces new complications, requires a larger number of locomotives, and may result even in loss of working time in loading wagons, since loading has to be suspended for considerable periods when the locomotive enters the siding, and this has a harmful effect on production. The Railway Board have further pointed out that so far as collieries with mechanical loading plant are concerned, the 10-hour or 12-hour system has no meaning, as these collieries require a constant supply of wagons, placements and drawings being done twice or even thrice daily. In other cases, the extension of the 10-hour system will require additional facilities in the way of holding accommodation, priorities and pilot reception lines,, and probably also necessitate the doubling of some colliery service lines.

We have carefully considered this question and are of the opinion that it will be a mistake to insist upon the introduction of one single system for all collieries. Conditions in the collieries are different and so long as the railways ensure that empties will be available to the collieries when they are wanted, they should be left free to work in accordance with any system they consider convenient.

Mechanical Loading Plants And Open Wagons

45. Altogether 93 collieries in Bengal and Bihar are equipped with mechanical loading plants. Normally, the loading capacity of 63 mechanical loading plants and chutes on the East Indian Railway system is 1,626 wagons while the maximum is 2,590 wagons. The average loading capacity of the 30 mechanical loading plants in the Bengal Nagpur Railway system is 700 wagons.

It has been brought to our notice that the installation of mechanical loading plants has been discouraged on account of the seasonal inability of the railways to supply the necessary number of open wagons which are essential to these plants. If a colliery which is fitted with mechanical loading devices is given covered wagons, it has to dump the coal on the ground to be loaded afterwards into the closed wagons by manual labour. This results in unnecessary expenditure, unnecessary waste of time and unnecessary breaking of coal. On the other hand, the pilferage of coal from open wagons has reached such dimensions that most of the important consumers have shown a definite preference for covered wagons. Attempts have been made to evolve covered wagons provided with roof hatches to permit of their being loaded by mechanical plants. Ten such wagons were constructed for experiment, but as the railways which received them did not realise what they were for, they were loaded and despatched to destinations all over the country in the ordinary way. During the course of our enquiry, these wagons were still missing and we were, therefore, unable to see them and cannot express an opinion on their possibilities.

The Railway Board have informed us that by the end of 1946 the total open wagon stock of the Indian railways will be 16,500 wagons more than in

1938-39, making a total of 67,000 (B.G.). On the basis of a 12-day turn-round, they estimate that there will be a sufficient number of wagons to meet all the requirements of the collieries. We trust that this may prove to be the case. The Railway Board have already entered a caveat that the East Indian Railway are experiencing difficulty in the Asansol area, as they obtain the majority of empties from the Calcutta and the industrial are a and these are largely covered wagons.

Over-loading And Under-loading

46. Previously collieries were charged for the actual coal loaded up to 2 tons below and one ton above the carrying capacity. In order to improve wagon utilisation, collieries are now charged one ton only below the carrying capacity. Also, many wagons due to defective springs are not permitted to be loaded in excess of capacity. In consequence, the percentage of over-loaded wagons has increased, causing difficulties in depot working. The collieries state that they have great difficulty in being accurate in loading partly due to inexperienced labour, the factor of free moisture and the different varieties of coal. They have pressed for a reversion to the old system of two tons below capacity. We have carefully considered the answer of the Railway Board in this connection, and are not convinced that the change over has resulted in the movement of more coal. We think the old arrangement shoud be restored.

Weigh-bridges

47. The Indian Coal Committee, 1925, examined the question of delays that took place at weigh-bridges and came to the conclusion that the installation of private weigh-bridges would solve many difficulties and that a full investigation of its possibilites was most desirable. They accordingly suggested the appointment of a Special Officer to examine the lay-out of existing sidings and to report to what extent the installation of private weigh-bridges and the provision of the necessary facilities for passing wagons over them would be feasible. The Committee were of the opinion that the actual work of weighing should be carried out by the collieries under the supervision of the railway staff and that the cost of the weigh-bridges and the staff required to work them should be met by the collieries who would be compensated by a reduction in the terminal charge levied by the railways.

We do not know whether in pursuance of these recommendations a Special Officer was ever appointed to report on this question, but private weigh-bridges were not adopted by the collieries to the extent contemplated by the Committee On the Bengal Nagpur Railway system only 8 private wiegh-bridges were installed. According to the Railway Board, the Committee did not realise that the installation of private weigh-bridges would be of use only under special conditions. The object of the Committee's recommendation was to eliminate weighment and adjustment of wagons at railwy depot stations and to reduce shunting operations. The Railway Board point out, however, that, theoretically speaking, the operations of weighment and adjustment should be a part of the internal operations of a colliery not requiring the use of a railway locomotive, *i.e.*, that private weigh-bridges are only suitable for collieries that can operate them by gravity.

A rebate of one anna per ton was granted in 1925 on coal loaded over private weigh-bridges. In the five suceeding years the Bengal Nagpur Railway

alone paid Rs. 38,000 in rebates and spent another Rs. 98,000 in re-modelling colliery sidings. The Railway Board state that as the railways feared that any extension of demand on these lines would put the railways to considerable expenditure, they "froze" the concession in respect of the collieries already enjoying it but declined to give it to any other colliery.

We have given this matter considerable thought and are of the opinion that the decision to withdraw the concessions on the Bengal Nagpur Railway was not sound. Had the Special Officer recommended by the Indian Coal Committee been appointed and had he taken stock of the (then) existing conditions, it would have been possible for the railways concerned to select the collieries to be allowed private weigh-bridges, and to have come to an understanding with them regarding the expenditure involved. The withdrawal of the concession without such an investigation was ill-advised, as no account was taken of the over-all effect which an increase in private weigh-bridges would have had on the movement of coal from the coalfields and on lessening the problem of under and over-loaded wagons.

We are convinced of the necessity of having more private weigh- bridges and fully endorse the recommendations made by certain witnesses that the installation of weigh-bridges should be encouraged in all collieries producing over 5,000 tons of coal per month. In fact, we would go to the extent of suggesting that all collieries producing over 10,000 tons of coal per month should be compelled to have their own weigh-bridges where practicable. The rebate of one anna per ton should be granted by all railways where a private weigh-bridge is installed.

48. We would like to refer to the speed at which the goods traffic in general and coal traffic in particular moves. The railways charge demurrage from a colliery and a consumer for any delay in loading or unloading a wagon. But on their part the railways are under no obligation to move and deliver their cargo within a certain time. This, in our opinion, contributes to the slowing down of the movement in general. The railways should make a special effort to move goods traffic a great deal faster. At present it is dead slow. A very senior railway officer told the Committee that there were sections on which the average speed of goods traffic works out at less than the speed of a bullock cart.

Sea Transport.

49. We have examined the question of sea transport in chapter V.

Conclusions And Recommendations.

(1) Our suggestions in this chapter should result in a net increase in output of approximately 11 million tons by 1956 over an approximate present output of 31 million tons.

(2) **The increase contemplated can be secured only if adequate rail transport facilities are provided. Our recommendations for increased transport facilites include—**

(a) certain extensions of the proposed Giridih-Hazaribagh Road-Hazaribagh and Gaya-Ranchi sections,

(b) provisions of better facilities in the Kajora/Jambad/Samla area of the Raniganj field,

(c) the construction of branch lines in the Pench Valleg field,

(d) increased facilities in Rewa State,

(e) construction of a branch line from the Khandwa-Akola section to go through the undeveloped coalfields of Betul district and on to the Pench Valley field,

(f) construction of a metre-gauge line to connect the metre-gauge bridge contemplated across the Ganges in Bihar with the Jharia, Raniganj, Bokaro and Karanpura fields,

(g) construction of a new broad-guage line from Manikpur through the Singrauli coalfield to meet the Burwadih-Chirimiri section at a suitable point,

(h) removal of the bottlenecks ringing the Bengal/Bihar fields, especially on the above Moghalserai section.

(3) A high-powered Committee should be appointed to go into the entire question of rail transport facilities not merely for coal traffic but for all traffic.

(4) A change is necessary in the hitherto accepted ideas on railway development, *viz*, that the railways constitute a "commercial enterprise" rather than that they should be a means to an end.

(5) A system of zonel distribution of coal should be carefully worked out. Western, Central and Southern India should generally be served by the Central India, Central Provinces and Hyderabad State coalfields.

(6) There is need for speeding up arrangements for the grant of sidings to collieries. Applications should be screened before being passed on to the Railway Board.

(7) The old rule about the under—and over-loading of wagons should be restored

(8) Where practicable, all collieries producing over 5,000 tons of coal per month should be encouraged to have their own private weigh-bridges; all collieries producing over 10,000 tons per month should be compelled to instal them. A rebate of one anna per ton of coal weighed should be given in all such cases.

(9) The speed of goods trains should be increased.

CHAPTER XXIII

RAILWAY FREIGHT RATES.

In this chapter we shall examine certain questions connected with railway freight on coal. We are not attempting a detailed study, but only briefly indicating what we have learnt from witnesses and from our own observations.

Reasonableness Of Present Freight Rates On Coal.

2. The first point to be considered is whether the existing freight rates should be maintained, enhanced or lowered. Unfortunately, the Railway Board are not in a position to tell us the cost of moving coal on the railways; they can give only the over-all operating cost. Accordingly, they have stated that revenue from public coal in 1944-45 was approximately 8 per cent. of the total and in 1939-40 was 7·4 per cent. All the three factors, *viz.*,

(1) over-all operating cost,

(2) cost of moving coal on the railways, and

(3) the principle of " what the traffic can bear "

have influenced the existing rates. The Railway Board add that consideration of the question under the three sub-heads could only be academic and of little value. They maintain that, as a general statement, it is correct to say that it is quite impossible to calculate the cost of carriage for different commodities. The general principle of what the traffic can bear, though not entirely free from defect, is an incidental one under which low-rated commodities such as coal may be said to be subsidised by the earnings on traffic of higher intrinsic value. This argument is sought to be supported by the following comparative figures of average earnings (broad-gauge) for 1944-45 :—

Public coal about 3·14 pies per ton per mile.

Grains and oil seeds about 18·13 pies per ton per mile.

Other commodities about 10·00 pies per ton per mile.

The inability of the Railway Board to sort out the cost of handling different kinds of traffic is a handicap. It was commented upon by the Indian Coal Committee, 1925, who, however, said that "unfortunately no country in the world had been able to separate the cost of hauling one ton of coal from that of hauling one ton of goods one mile." We do not know what the present position is but we refuse to believe that this is a matter beyond human ingenuity.

3. In the absence of this break-down, we have to rely on what the Railway Board have stated and it is obvious from it that coal is being carried at a rate considerably below the rates applicable to other commodities. This is as it should be, coal being a basic raw material. In the statement below we have indicated the average rail freight charges from

certain B.N.R. and E. I. R. stations, to Madras, Bombay and Karachi City by all-rail route.

Station to	From	
	B.N.Rly.—Jharia, Chaurashi, Radhanagar and Bokaro-Jharia fields	E.I. Rly.—Colliery Stations, *e.g.*, Ondal, Barakar, Rajhara Siding, etc.
	Rs. A. P. per ton	Rs. A. P. per ton
Madras	13 9 10	13 15 0
Bombay	14 13 7	14 13 7
Karachi	17 10 1	17 1 6

NOTE.—The above figures denote only the average rail freights and do not include the various cases leviable on this traffic.

On the whole, railway frieghts are not so high considering the distances coal has to be carried and we do not think that there is any case for a general reduction in the freight rates on coal; though if, in our attempt to simplify them, the rates in any particular case do get reduced, it would be all to the good.

4. No case has been presented to us for an increase in railway frieghts on coal *per se*. But if on account of the general rise in the cost of working the railways, Government are contemplating a revision of freight rates all round, we would urge that the principle of giving coal preferential rates should be maintained. Coal is a commodity which must be carried at the lowest possible rate in the intreresrts of general industrialisation.

Group Rates.

5. By group rates we mean the same rates to the same destination from all the collieries situated within a coalfield or a well-defined area. Such a system already obtains in respect of the Jharia coalfield. The introduction of the system was recommended by the Indian Coal Committee, 1925, in respect of the Raniganj coalfield as well. In this connection, we cannot do better than quote at length from the Railway Board's reply to Question 21—Questionnarie I:—

"The question of applying the gouping principle in the matter of fixing rates for Public Coal from the Raniganj coalfield came up from time to time. It has as a rule been put forward by those interests who stand to benefit from it and has been opposed by those who would be put at a disadvantage competitively by the change. The issue came up for examination by the Railway Rates Advisory Committee in 1936 in case No. XLV (Messrs. Martin & Co., Calcutta *versus* the East Indian Railway). The Railway Rates Advisory Committee dealt very fully with the matter and came to the following conclusions:—

(I) The existing method of rating in the Jheria field (Group rate) was necessitated by reasons of competition and as this circumstance is entirely absent in the Raniganj field any comparison drawn with the Jharia field is inapposite.

(II) There was no evidence that the existing method of rating in the Raniganj field prevented the various collieries from obtaining a fair share of the total demand.

(III) There was no justification to show that group rating from Raniganj field was justified in the public interest. There was no evidence of lack of competition in the Calcuttla market or of a monopoly of by the collieries which have the lowest rate.

(IV) There was considerable force in the point that a sudden disturbance of the present system of rates which had been in force for so many years by the adoption of group rating would involve the railway in a charge of undue prejudice.

This question was again considered by the Railway Board in 1940 and the following are some of the reasons why no change was decided on:

"Inevitably a change over from a system of mileage rates to a system of group rates where relative distance is wholly or largely discarded would react to the advantage of collieries that have geographical disadvantage and *per contra* to the disadvantage of those collieries that have a geographical advantage. There is bound to be grave dissatisfaction among the latter group. It is easy to appreciate that with the elimination of or a substantial reduction in the freight advantages such as is entailed by the application of a system of group rate which must have some arbitrary basis, many collieries that are now able to keep up production and make a livelihood may not be able to do so under altered conditions.

"It has to be remembered also that the present system of rating Raniganj Coalfields traffic on the basis of distance has prevailed for a considerable time and that the investment of capital in and siting of collieries and sidings has been greatly influenced by the existing system of mileage rates and rate relativities. To alter the system now would cause a serious disturbance of the industry as now constituted and it is particularly the small interest that would be adversely affected.

"There is no strict definition of what consititutes the 'Raniganj Coal fields' but the term is generally understood to cover colliery sidings below Dhanbad in the direction of Howrah situated—

(*i*) On the Ondal-Sainthia Chord including the Kasta Branch line to Palasthali.

(*ii*) The main line and extensions Ondal to Sitarampore.

(*iii*) The Ondal-Baraboni loop with the extension to Gaurangdih.

(*iv*) The main line up to Rupnarainpur.

(*v*) The Grand Chord line up to Kaloobathan inclusive.

"There are some 217 colliery sidings in the Raniganj coalfields as so outlined and whole of the work of invoicing traffic from these sidings is done at:—

(1) Ondal (116 miles to Howrah).
(2) Asansol (132 miles to Howrah).
(3) Sitarampore (138 miles to Howrah).
(4) Rosundaga Siding } These serve the particular colliery or con-
(5) Burnco Siding. } cern only.

"In the rating of this traffic altogether 27 chargeable points are provided from which rates are calculated.

"It would obviously be no easy task to group all these numerous sidings into a small number of groups so as to avoid all complaints or to avoid unduly penalising some interests unduly benefitting others. If there were to be more than one group the allocation of collieries or mileage to several

groups would have to be on some arbitrary basis and there would always be pressure from collieries to be put into a lower or the lowest group rate.

"In view of the circumstances explained, it is not considered feasible to introduce the group system of rates from the Raniganj field.

"The Railway Board adhere to this view."

We must confess that we remain unconvinced by the arguments advanced by the Railway Board. We do not think it would be impossible to introduce group rates in this coalfield also. In our opinion, the railways should have group rates for all important coalfields, *viz.*, the Raniganj, Bakaro, Karanpura, C.P. and Central India coalfields.

Pooled Rates.

6. This brings us to the question of pooled freights. Some witnesses have suggested that a pooled freight system should be introduced so that all consumers of coal in the same zone would pay equally for their coal, no matter where the coal comes from. The intention is to bring about an equalisation of fuel cost at various centres but the request does not, however, show a proper appreciation of the interplay of other factors in the location of industry, such as nearness to sources of other raw materials or to markets. We cannot, therefore, support the proposal.

Need For Different Rates For Different Classes Of Coal.

7. Our question whether railway freights should be uniform for all classes of coal or whether they should be different for different classes has elicited more answers than any other question relating to freights. Those who are in favour of differential rates have urged, with a great deal of justification, that the existing system of uniform rates has been responsible for the misuse of metallurgical and other good quality coals. In the words of the National Cement, Mines and Industires, Ltd., "the present freight policy definitely encourages the dissipation and mis-utilisation of better class coals" and they suggest that, as the selling prices of different kinds of coals have been fixed on the basis of quality, *viz.*, ash in respect of the Barakar coals, and ash and moisture in respect of the Raniganj coals the same principle should be adopted in the fixation of railway freights. It does not require argument to show that a uniform system of rates favours the better quality coal and places inferior coal at a disadvantage. We think that eventually differential rates may, therefore, have to be introduced in the interests of national economy and the easiest course would be to have two rates, one for Selected Grade and Grade I coals, and the other for all other coals. The introduction of two rates should not be difficult to work or "complicate the Rate structure and open up a wide field for fraud", as the Railway Board fear.

It does not, however, seem possible to introduce differential rates for the time being. Reference has been made by the Indian Mining Association to the effect of the increased use of low grade coal on the transport system. This argument, in our opinion, clinches the issue so long as transport remains difficult. We have stated elsewhere that the railways will not be able to move all the coal that might be produced and for which there is a demand. If by differential rates we give an additional impetus to the production of low grade coals, particularly in the areas where there are already traffic hold-up, the situation will become quite impossible. It can, of course, be argued

that in the areas in which the transport difficulty is not a barrier, the objection to the introduction of differential rates is not valid. But there would arise an invidious distinction as between different areas, and we cannot, therefore, support this view. The question of introducing differential rates should be re-opened when the general transport situation in the country as a whole eases.

8. In this connection the Coal Consumers' Association have suggested that there should be two sets of freights, one for coal used as fuel for steam raising in boilers, *i.e.*, for power purposes, and another for coal which, before it is used, has to be processed to make it a suitable raw material for industry. They have explained this point of view at some length, but we do not agree that a case exists for bringing about this differentiation. The major industries which utilise coal as in the second category can, in our opinion, well afford the freights which they are paying on their coal at present.

Telescopic Rates.

9. We are of the opinion that the present system under which the railways have two telescopic rates, one for distances up to 400 miles and another for distances over 400 miles, should be changed and recommend that the telescopic rate for distances up to 400 miles should be abolished. There would then be only one telescopic rate. As there is a considerable amount of traffic to which the 400 mile telescopic rate applies at present, its abolition will no doubt mean some financial loss to the railways, but it will simplify the freight system and will remove its present inequities; for it is certainly inequitable that Punjab coal should pay a freight to Lahore entirely disproportionate to the distance moved in comparison with the freight on Bengal/Bihar coal. Our proposal has the further merit of giving consumers an inducement for drawing their supplies from nearer sources.

Certain coal producers in outlying provinces have protested against the telescopic system which they say encourages long lead traffic. We cannot think that any other system is possible. Incidentally, the abolition of the slab system will be of benefit to such producers.

Coal In Train Loads.

10. We asked certain witnesses whether they would agree to the suggestion that reduced freight rates should be charged for train loads of coal consigned to one consumer. The railways themselves are opposed to the suggestion. The Railway Board maintain that coal is invariably transported in full wagon loads which are at times despatched from depot stations in full train loads. Moreover, large consumers frequently receive a number of wagon loads by the same train. They are therefore opposed to any reduction of freights on train loads. On the other hand, a number of consumers have advocated a reduction of the rate for train loads, as they feel that it will result in a quick turn round of wagons and locos and reduce congestion in the marshalling yards. The small producers are, however, for obvious reasons, greatly opposed to the proposal. Others point out that the system will lead to the hoarding of coal and will give an unfair advantage to large consumers. We do not think that a convincing case has been made out for a reduction in freight on train loads. Large consumers are very few and large collieries which can send out train loads are also very few; and since this concession would benefit only a few, we do not recommend it.

Seasonal Rates.

11. We have examined the question of introducing seasonal rates. Neither the Railway Board nor the producers, not even the consumers are in favour of these rates and we regard them as impracticable because, generally

speaking, the production of coal is at its lowest during the monsoon when wagons are most freely available.

Freight Payment System.

12. The freight payment system has been described by witnesses to be satisfactory, on the whole, and the general opinion is that it should not be altered. There are, however, one or two special points which require consideration. Some witnesses pointed out that, with the increase in the pilferage of coal *en route*, the system of charging rail freight on coal despatched without regard to the actual coal delivered at the destination is causing unmerited hardship. It has been suggested that the railways should be compelled to make good the loss *en route* by charging a slight premium for such insurance worked out on an actuarial basis; the present difference in the rates for "owner's risk" and "railway risk" seems high and is apparently not based on any exact calculations. There is considerable force in this argument; unless the railways are made responsible for the loss *en route*, thefts of coal are not likely to diminish.

13. Another point that was made by one witness was that the railways require payment for the railway receipt in its entirety irrespective of whether the consignee has received all the wagons or not; and once the freight is paid, the railways forget about the short-delivered wagons and in spite of repeated reminders leave claims unsatisfied for long periods. An obligation should be put on them to settle such cases promptly and satisfactorily.

Section 42 Of The Railways Act.

14. It has been suggested that the introduction of group rates or differential rates on inferior coal may offend against certain provisions of Section 42 of the Indian Railways Act. These provisions may have been necessary for a system of Company-managed railways, but they should not in our opinion, be allowed to interfere with the implementation of policies deemed necessary on public grounds. If there is any difficulty, therefore, the section should be suitably amended.

Conclusions And Recommendations.

(1) The present freight rates on coal, with certain exceptions seem reasonable. **If any general revision of freights is undertaken in consequence of the increased cost of operation of the railways, the preferential treatment now accorded to coal should be maintained.**

(2) **The group system of rates should be extended to all important coalfields.**

(3) **We recommend differential freight rates on inferior coal but consider that their introduction should be postponed until the rail transport position in the country as a whole eases.**

(4) There is no case for different freight rates on coal used as fuel and as a raw material for processing in industry.

(5) **The separate telescopic rate on coal for distances up to 400 miles should be abolished.**

(6) There is no case for a lower rate on coal carried in train loads to one consignee.

(7) Seasonal rates are impracticable.

(8) **There are no complaints against the freight payment system, but a small premium worked out on an actuarial basis should be levied on freight and the railways should then carry the risk on coal *en route*.**

(9) **If the introduction of the group system of rates or differential rates necessitates amendment of Section 42 of the Railways Act, this should be undertaken.**

CHAPTER XXIV

THE CONTROL OF DISTRIBUTION AND MARKETING

In this chapter, we propose to supplement such observations as we have already made on controlled distribution, central marketing and the position of middlemen ; and we shall make our recommendations regarding the degree of Government control over the marketing side of the coal industry which we think to be necessary.

Need For Continuance Of Control Over Distribution.

2. The case for a complete control over distribution, in our opinion, is unassailable so long as the production of coal is not adequate to meet the demand and while the position of the railways is such that there is a shortage of wagons for coal more or less throughout the year. Judging by the evidence of the witnesses we have examined, the consumers and the coal industry generally favour a continuance of control in such circumstances. It is clear that, in the alternative, there might be difficulty in maintaining essential services and public utilities and there will certainly be a considerable rise in the price of coal and extensive black-marketing operations, since, in times of shortage, experience has shown that price can only be controlled if distribution also is effectively controlled.

3. We, therefore, recommend that control should continue for the present. There is general agreement amongst the witnesses that the system of control evolved during the war has on the whole worked fairly successfully. The one complaint regarding it is that it is too much a matter of personal rule and that the work should be done through a Board. Certain witnesses have also stated that collieries which produce inferior grades of coal are often denied an adequate supply of wagons, as a large number of wagons is being allotted to collieries producing higher grades of coal. This raises a question of requirements and priorities which should be viewed in the context of the shortage of wagon supplies and which were matters governed by the policy adopted by Government. They were not within the discretion and competence of the Officer in actual charge of coal distribution.

As regards the suggestion that distribution control should be exercised through a Board, it should be remembered that the railways are trying to work to maximum capacity every day. The daily movement of emptie's and loaded wagons, the conditions on the line both in the coalfields and elsewhere, the conditions obtaining at the different collieries, all these factors and more influence loadings. The Officer-in-charge should be able to grasp any situation arising in a moment and should be capable of taking quick decisions, and throughout the day numerous telephonic instructions have to be issued to the different railways. Every moment, in fact, counts and if the system of allocation and distribution were to be turned over to a Board, the inevitable delay in handling daily emergencies would reusult in a considerable loss of transport. We are therefore of the opinion that the idea of a Board for making the daily allocations is wholly impracticable. But in order to meet the objection urged before us so far as is, in our opinion, practicable, we suggest that a small Committee may be constituted which would periodically review the practical operation of the system and examine any grievances which either collieries or consumers wish to put forward. Thi,

Committee will, we think, not only act, to some extent, as a safety valve but will also serve as a check upon the Officer-in-charge of distribution. It is necessary that the Committee should function in Calcutta and it might, we think, consist of the representatives of Government, the producers and consumers.

Statistics Necessary For Efficient Distribution Control.

4. It is, we think, essential that certain statistics should, in future, be carefully maintained, in the first place by the authority controlling distribution and, thereafter, by the authority which we propose in a later chapter, in order that a clear picture will always be available of the estimates of the production and the transportation available as compared with the consumers' stock position and the estimated demand. The statistics which we regard as essential are the following and they need to be kept on a monthly basis and compiled at as early a date as practicable after the close of each month.

(1) A monthly return from all collieries showing their stocks at the beginning of the month, their raisings during the month, their despatches during the month—colliery consumption to be shown separately—and their stocks at the end of the month, steam and slack coal being shown separately.

(2) A monthly estimate from all collieries of their raisings of steam and slack coal monthly for the following three months (7% of the over-all figure will have to be deducted in the Statistics section for colliery consumption).

(3) A monthly estimate from the East Indian and Bengal Nagpur Railways of the amount of coal they can move montly for the ensuing three months.

(4) A statement of stocks held at the beginning and the end of the month and consumption during the month, submitted monthly by big consumers such as all the railways, the steel companies, the cotton textile mills, cement companies, jute mills, public utilities, the inland water transport and lighterage companies and depot stocks of bunkers at the various ports.

(5) Any other statistics which may later be found to be necessary may, of course, be added.

We have seen the form of the monthly report regarding raisings, despatches, stocks and labour prescribed by the Government of India under their notification No. 1395, dated the 21st August 1945. This report no doubt furnishes some useful information, but, as we have stated, more is needed if distribution control is to be efficiently exercised.

Change-over From Complete To Modified Control Over Distribution.

5. We consider that, with the help of these statistics, it will not be difficult to judge when the time is appropriate to change from the temporary system of complete control over distribution to a system of modified control, which we shall now proceed to deal with. It is difficult for us, however, to give any forecast as to when a change-over may become possible. The figures of estimated requirements, and the increase in coal production which they necessitate, which we have calculated as the basis of this report, are con-

ditional upon large-scale plans for a fairly rapid industrial development throughout the country ; and if production is stepped up, we hope that it will be closely related to these anticipated increases in industrial activity, as otherwise there will be over-production of coal.

6. There is one small point with which we should deal before leaving the temporary system of complete control over distribution, and that is whether a change to modified control should be made after the railways and large industries have built up adequate stocks. Since the change will only be made after production is deemed to be equal to demand and since there will inevitably be a time-lag in determining when that situation has arisen, there will be a short period when production exceeds actual consumption. We feel that the situation as regards reserve stocks would thus probably take care of itself.

7. We come now to the position when complete over control distribution is no longer justified having regard to production and transport, and our view is that there will then be still the need for modified control in respect of certain requirements, such as coking coal, and coal for exports and railways. The imposition of a limited control only is, however, dependent on the results of the chemical and physical survey of coal and the study of consumer requirements, which may disclose the need for a thorough-going regulation of use. We have already made it plain that good coking coal must be reserved, as soon as this becomes practicable, for industries which are dependent upon it, and it will, therefore, be necessary to introduce a system of licensing by which the purchase of coal from collieries which are declared to be producing coking coal is regulated. A licensing system will also be necessary in regard to coal for export. This modified control and the operation of the licensing system should, we think, be entrusted to the authority which we recommend in a later chapter, and it will be for that authority to determine the actual procedure to be followed.

Central Marketing Agency.

8. Before coming to our conclusions in regard to the removal of general control over distribution, we should refer to the necessity and possibility of retaining control through some form of a central marketing agency. Such an agency has obvious advantages not only from the point of view of stabilisation of the coal industry, but as a means of ensuring that the country's coal resources are utilised to the best possible advantage by allocation to consumers of the class of coal considered suitable for their individual requirements. The opinion of the majority of the witnesses before us regarding such an agency, either on a voluntary basis or under Government control, was that, while it might be feasible, it would, in all probability, be inefficient and cumbersome and the need for it was questionable. We ourselves feel that there is some force in this opinion in that such an agency would involve a very large organisation, which is at present not available and which will take some time to build up, and finally that until we have acquired a greater knowledge of our coals through a chemical and physical analysis, the establishment of any central marketing organisation is not justified. It is, however, a possibility which should, we think, be borne in mind, since a situation may arise at a later date requiring such action.

Middlemen.

9. It is necessary for us here to say something regarding the place which we assign to middlemen in the industry. Middlemen consist, broadly speaking, of four classes—

(1) suppliers' agents overseas and in ports who act as selling and bunkering agents for suppliers over wide territories and who are usually remunerated on a commission basis;

(2) merchants who buy outright from suppliers and sell the coal on their own account in the territories or industries which the suppliers may assign to them; when these merchants act as principals, they take the *del credere* risk of sales made by them as well as any profit and loss they may make on the business;

(3) suppliers' brokers, who canvass business for their principals on a commission basis;

(4) consumers' brokers, who look after the interests of their principals and are remunerated by a commission from the consumers, and not the supplier; these, for the most part, are a war-time growth.

Under any system of complete control over distribution, there is little place for intermediaries; but as the system of complete control introduced during the war was not regarded as a permanent measure, it was felt by the coal industry that the position of middlemen should be safeguarded in order that they would be in a position to resume their business on the removal of control. When, therefore, the Colliery Control Order was issued in 1944, the position of middlemen was officially recognised, but there was some argument over details in the matter and it was not until October, 1945, that the following orders were issued as a part of the Colliery Control Order: they are still in force:

"6 (1) Where a colliery owner has signified to the Deputy Coal Commissioner (Distribution) in writing his willingness to sell direct to consumers and an allotment is made by the Deputy Coal Commissioner (Distribution) to a consumer with his consent for such direct sale, the coal shall be delivered to the consumer at the price fixed under clause 4, and no commission or other charges shall be paid in addition, except that where a broker is employed, a brokerage not exceeding six annas per ton may be paid by the colliery owner to the broker.

"(2) Where a consumer purchases coal through a *del credere* agent, such agent shall not, on the sale of such coal, charge or receive from the consumer a margin over the price fixed under clause 4 which exceeds:

(*a*) four rupees per ton in the case of hard coke, or

(*b*) one rupee eight annas per ton in the case of soft coke or coal

and if, in any such transaction as aforesaid, a broker is employed or the *del credere* agent himself serves as a broker, a brokerage not exceeding six annas per ton may be paid by the colliery owner to the broker or, as the case may be, to the *del credere* agent.

"(3) Where in any transaction governed by sub-clause (1) or (2) more than one broker or *del credere* agent is employed, the total of the brokerages or margins charged in respect of the

transaction shall not exceed the maximum prescribed in the said sub-clauses and shall be divided between the brokers or agents in such proportion as may be agreed upon.

"(4) If any question arises whether a person is a *del credere* agent or a broker or both *del credere* agent and broker in respect of any transaction, it shall be referred to the Deputy Coal Commissioner (Distribution) whose decision shall be final.

"(5) Nothing in this clause shall apply in relation to a transaction involving less than one wagon-load of coal."

10. There are a number of comments we wish to make on the present position. With reference to sub-clause (1) of clause 6 of the Colliery Control Order, we think it extraordinary that the sale of coal direct to a consumer should be dependent on the consent of the Deputy Coal Commissioner (Distribution). We can see no justification for this provision which, in actual working, has been responsible for certain evils. As regards the various types of middlemen now existing, there is a limited justification for the merchants who act as principals and take the *del credere* risk; their main value is in the detailed distribution of coal, as for example for domestic use or for small consumers. Direct sales, in such cases, being generally for less than wagon loads, are impracticable for various reasons which should be readily obvious. But beyond this we do not think that *del credere* agents are a necessary link in the marketing structure. Much less useful, and perhaps more abused in practice, is the system of consumer's brokers, which, as we have stated, has grown up mainly during war-time. We would like to see the early disappearance of this class of middlemen, but the matter is one for the decision of consumers. To the extent that the type may have grown up in consequence of the provisions of the Colliery Control Order, we suggest that Government should remove the defect.

We shall only briefly refer to the remuneration of middlemen under the Colliery Control Order. In the midst of the complete control over distribution which has prevailed, we assume that middlemen have had to exert themselves but little in the procurement and distribution of coal. It is surprising, therefore, that their remuneration has been fixed at a figure so very much higher than in peace-time; this criticism applies more particularly to the case of the *del credere* agent. We have not gone into this matter in sufficient detail to make a definite recommendation other than that Government should reconsider its decision.

Prices And Possible Over-production Of Coal.

11. We turn now to the question of control over coal prices. We have shown in earlier chapters how unfavourably the low prices for coal, which prevailed some ten years ago, reflected on mining practice, and we feel that it is essential that the price of coal should not again be allowed to fall to uneconomic levels. This opinion is supported by the fact that we are adovcating in this report that every effort should be made to increase the production of coal in order that the increased industrialisation of the country, which is now planned, may become possible; and should production be stepped up in accordance with our recommendations, and the development of industrialisation be delayed, the coal industry would have some cause to feel aggrieved if the state of over-production thus created is allowed to result in a serious fall in coal prices. We feel, therefore, that Government should continue to control the price even after control over distribution is modified,

and that, as stated in an earlier chapter, the price should be related to wages. We are aware of the fact, and have indeed mentioned it already in this chapter, that, hitherto, no effective price control has been possible without control over distribution, but this has been in times of shortage and, according to our recommendation, control over the distribution of coal will continue so long as there is a shortage of coal. Our problem, therefore, is not a rise in the price of coal above the controlled price once control over distribution is removed, but a fall below the controlled price, since a state of potential over-production will then be in existence. We feel that the answer to this is for Government to control production to the extent necessary to relate it to demand. This can, we think, be done simply and effectively by assessing monthly, in the light of the statistics which we have recommended, the estimated supply and demand, and, if supply appears to be outstripping demand, then regulating the supply of wagons to collieries in accordance with a quota allotted to each, so as to bring about an all-round curtailment in production. This control over production would remove the temptation towards price-cutting to obtain business which might otherwise again prevail in a system of almost free marketing. It appears to us that stabilisation of price at an economic level can only come about through complete control of the selling side or a regulation of the production side and that the latter appears to be the simpler method.

Conclusions And Recommendations.

(1) **Distribution control must continue so long as shortages of coal and of rail transport continue.**

(2) The war-time system of control has, on the whole, worked satisfactorily but **we suggest the appointment of a small Committee to review the work of the controlling officer and to examine grievances.**

(3) **For the efficient operation of distribution control, the collection of certain statistics is essential.** They will be valuable also in ensuring that production does not outstrip demand.

(4) **When supply has overtaken demand, the complete control over distribution should be modified.**

(5) Distribution control through a Central Marketing Agency is not justified at present.

(6) **The Colliery Control Order, in its reference to middlemen, has certain defects which should be removed.**

(7) **Control over prices should be continued even after control over distribution is modified.**

CHAPTER XXV

THE COMPOSITE PLAN.

If progress and stability are to be secured, the production, distribution and consumption of coal must be integrated into a harmonious whole; for a divergence of aims or interests in relation to any of these three aspects will inevitably throw the other two out of gear. We hold that the responsibility of bringing about this integration must rest with the State and that it can be achieved only by the adoption of an orderly plan.

2. Of primary importance are the immediate and prospective coal requirements of the country, for these must determine the extent of the development both on the production and the transport side. It can be stated with some confidence that the country can immediately absorb about 30 million tons of coal per annum. But, in the main, transport is the present bottleneck to increased supplies; and our best effort so far has been 26 million tons delivered in 1945, out of a total production of about 30 million tons. The demand, moreover, is a growing one, and if present expectations of large scale industrialisation materialise, as there is reason to hope, coal requirements will steadily grow to about 41 million tons per annum by 1956. But our suggestions for a limitation on exports and for the increased provision of electricity in the coalfields and for railway traction will, along with power developments elsewhere in the country and a larger use of oil by industry, have the effect of reducing requirements by about 2 million tons per annum. Our target for production will, therefore, be about 42 million tons in 1956, for a reasonable allowance over net consumer requirements must be made for colliery needs.

While requirements will grow, there will be little voluntary regulation of use without conscious direction. Such regulation may be necessary for two reasons: either to conserve limited resources of a particular class of coal or to secure efficient utilisation. In India, the reserves of good coking coal, which is so essential to the metallurgical industry, are not likely to exceed about 750 million tons, though these can be extended somewhat by resort to blending and washing. For many years, the output of this coal was 9 to 10 million tons per annum, though in the last 2 or 3 years production is probably down by about 2 million tons. Even so, the reserves must be considered small for so important an industry and the need for regulating the use of good coking coal seems indisputable. As against the present consumption of 7 to 8 million tons annually of good coking coal, out of a total consumption of about 26 million tons, we envisage that the consumption by 1954 would have been reduced to about 4 million tons out of the total of 39 million tons. This, we suggest, should be secured by increased resort to blending and washing and by a prohibition of the use of good coking coal by other than two specified classes of consumers.

The regulation of use for the purpose of securing efficient utilisation is not a practical proposition in India until the physical and chemical characteristics of our coals have been studied and correlated to industrial consumption and optimum requirements. When the data are available, the need for regulation by the State would depend on the divergence between actual consumption and scientific requirements and on certain other factors. No country, certainly not India, can afford to be reckless in its fuel practices and the ground must, therefore, be prepared quickly for reaching a decision

on merits about the need for enforced regulation of use. Till then, however, sufficient data are available to direct the consumption of some users on certain lines.

3. Requirements naturally determine the production of coal. The net increase in output required to meet the eventual demand is about 11 to 12 million tons per annum, but new development must also aim at producing about 3½ million tons more to replace the good coking coal proposed to be conserved. Our proposals include intensified output in the present fields and the opening up of hitherto undeveloped fields. The former, we expect, will, by 1956, yield an additional output of 13½ million tons and the latter of 2 million tons annually.

The development of a new colliery is a slow business ; so is the provision of increased transport facilities. But we do not think it over-optimistic to hope that each year from 1947 onwards about 1½ million tons more of coal will be brought into consumption. Starting from the 1945 figure of 26 million tons, our plan would secure a balancing of demand and supply by about 1954.

On the production side, it is necessary to revise our ideas regarding the desired rate of extraction of the coal *in situ*. Until 1936, the percentage of extraction was only about 50, but latterly there has been an improvement due to stricter mining regulations and greater resort to voluntary stowing. For the future, the objective should be practically complete extraction of coal seams with an ash content of up to 30%. The object is essentially the avoidance of waste in mining, but the method of achieving it, *viz.*, sand stowing, which we have recommended, also ensures maximum safety. If waste in extraction is to be avoided, stowing should be made compulsory, and this we propose ; we also recommend that such compulsory stowing should be assisted, up to a maximum of Rs. 2 per ton of coal extracted, from the proceeds of a greatly enhanced cess on coal despatches. This wide extension of stowing will help further to conserve the limited resources of good coking coal ; for the percentage of extraction will rise from the present 70% or so to over 90%. Thus, a measure essentially of sound mining practice has an important bearing on our good coking coal position.

An increase in production is not just a matter of opening up new mines. So large an increase must be rationally achieved, but there are a number of aspects in our industry which stand in the way of rational development. The private ownership of mineral rights in the two most important coal bearing provinces of the country is one ; an inadequate and unsatisfactory labour force is another ; and the danger of fluctuating prices is a third. We consider that the State must acquire mineral rights in the Permanently Settled areas of Bengal and Bihar ; without this step, long overdue and essential reforms cannot be carried through, nor would orderly development under the control and guidance of the State be facilitated in the future. The labour force must be augmented and trained, but we see no hope of either unless, by adequate wages and reasonable amenities, a worker is attracted and made attached to coal mining. Adequate wages and amenities amongst other things must determine the price of coal, which needs to be stable over a period and reasonably profitable to attract capital and talent to new large-scale development. There is need, too, for guarding against over-production with its inevitable repercussions on prices.

There is thus need for Government direction of fresh development on sound lines and Government control over prices. As a corollary to the latter, Government must take a hand in the determination of proper wages for labour and in the provision of reasonable amenities, of which we consider education one of the most important. And lest labour should prove inadequate, Government should encourage, and, if necessary compel, greater resort to mechanisation in new fields and collieries.

4. The coal produced must now be distributed. Distribution embraces both transport and marketing. The former, though reasonably adequate in the pre-war days, except during periods of peak wagon demand, seems now to be totally inadequate to move even immediate requirements. In the main, the difficulty is one of inadequate wagons and power and limitations of track. Unless urgent steps are taken to improve the position all round, the planned industrialisation of the country will surely be strangulated. There is need for a searching investigation into the over-all transport requirements of the country arising out of the industrialisation programmes. But, meanwhile, there are certain measures which can be implemented within a reasonable period of time and which will afford direct assistance to our schemes for enhanced coal raisings.

Marketing, in the pre-war sense, has been largely dormant during the years of war-time control over distribution; for this control sought to decide not merely who shall receive how much coal but also, on a rough and ready basis, the quality each consumer would get. Controlled distribution was essential to secure the best possible use of limited supplies. But this shortage of supplies has not ended with the war; unless production and transport are greatly increased, and that too quickly, the shortage is likely to last for many more years. And so long as it lasts, the case for control over distribution is unassailable. With the best possible effort and provided always the demand for coal grows as envisaged by us, it is unlikely that a balancing of supply and demand will be achieved much before 1954. Thereafter, a modified control only over distribution may be needed, its object being to regulate the use of coking coal and the requirements of the railways and of the export trade. But if eventually a complete regulation of use is decided to be necessary, a complete control over distribution would be inescapable; and in such circumstances, there may be advantages in bringing a Central Marketing Agency into being.

5. In brief, our plan seeks to regulate use where necessary or practicable. Production will be planned to conform, as quickly as may be, to demand; and certain essential pre-requisites for sound development will be provided. Most important among these are adequate transport, stable price and an adequate, settled and contented labour force. Responsibility in relation to all these lies heavily on Government. For co-ordinating such varied and complex activities, centralised planning and energetic action are essential.

PART IV

CHAPTER XXVI.

RESEARCH.

Research In Relation To Coal.

At many places in this report we have drawn attention to the urgency and importance of undertaking investigation and research as the only sure means of providing a sound basis for the exploitation of the country's coal resources. The need had been recognised by the Coal Mining Committee, 1937, who recommended the setting up of a Coal Research Board for initiating and directing research on many pressing problems, such as the classification of Indian coals, cleaning and blending, soft coke manufacture, recovery of bye-products, ventilation and lighting in mines, etc., etc. Until very recently, however, no action was taken by Government on this recommendation; and what has lately been done is in our opinion, inadequate.

2. The United Kingdom Royal Commission on the Coal Industry, 1925, has given a lucid exposition of what research can and ought to do in relation to coal. Research should aim at a study of:

(*a*) occurrence and constitution, including

(*i*) the geology of the occurrence of coal, and

(ii) the constitution of coal in general and the characteristics of the individual seams in particular,

(*b*) coal winning, including

(*i*) the characteristics of the coal measures from the point of view of coal winning,

(*ii*) methods of working and standardisation of plant, apparatus, appliances and material,

(*iii*) ventilation,

(*iv*) the human side,

(*v*) safety,

(*vi*) health, and

(*vii*) preparation of coal for the market, including cleaning, grading etc.,

(*c*) coal utilisation, including

(*i*) utilisation of coal in its natural state, and

(*ii*) treatment of coal for the production of other forms of fuel and the possible recovery of products other than fuel by

(1) destructive distillation at high and low temperatures,

(2) pulverising for the production of colloidal fuel,

(3) liquefaction of coal by the Bergius process, and

(4) synthetic methods (e.g. the conversion of water gas produced from coke into liquid fuels for use in internal combustion engines).

Research of national importance, such as that connected with the nature, preparation, treatment and utilisation of coal and other fuels is undertaken in the United Kingdom by a Fuel Research Board which works through a Central Fuel Research Station and nine Coal Survey laboratories. In addition, a number of Industrial Research Associations, working in close co-operation with the Fuel Research Board, concentrate on research primarily for the benefit of their members but which nevertheless advances knowledge all round. A certain amount of work is also done in the private laboratories of industrial concerns, mainly for their own purpose and in some universities. Apart from certain fundamentals, which must be studied in any case, the nature of detailed research in a country must be determined primarily by the needs of its industrial structure. But the broad requirements emerge sufficiently clearly from the analysis given by the Royal Commission.

Requirements Of the Indian situation.

3. Following that analysis and applying it to India we have considered what is necessary in our conditions. Under the occurrence and geology of coal, a certain amount of work has been done by the Geological Survey of India. There is a fairly clear idea of where coal occurs, but it is unlikely that all deposits have been discovered. And because what is known is not so plentiful having regard to the size, population and industrial possibilities of the country, the search must continue. But this should obviously take precedence after a more thorough and systematic prospecting and proving of the deposits that have been discovered. In comparison to what has been done, in this matter, in other countries, we can only say that much still remains to be done in India. Considerable known areas lie unprospected, and where prospecting has been done, the information available is of little immediate benefit for development purposes. Actually, it would be correct to say that more has been done in the detailed proving of our coal reserves under private initiative than under Governmental auspices. We feel, however, that this is not a very desirable state of affairs, for, if the development of mineral resources, and especially of coal resources, is of national importance, which it undoubtedly is, it is anomalous that the prospecting and proving of reserves should be left to private enterprise. Elsewhere, we have referred to the alleged inadequacy of the present maximum period of 3 years for a prospecting licence; the Complaint arises because the work hitherto done by the Geological Survey of India on the prospecting and proving of coal deposits is of little help. We think, therefore, that the State should take upon itself the responsibility of mapping known coal reserves in greater detail. We know that the Jharia and Raniganj fields have been fairly fully studied by the Geological Survey of India, but much remains to be done in the Central Provinces and Central India. The Karanpura and West Bokaro fields have been prospected by private companies, but if our recommendation about the acquisition of mineral rights is accepted, a careful check on the work done must obviously be undertaken. There are also, according to the Geological Survey of India, a number of other deposits in which much geological work requires to be done.

We have been informed that the staff of the Geological Survey is being increased four-fold and this we consider a good step, for the main handicap hitherto has been the shortage of trained staff. We think the Geological Survey should give first priority in its programme of work to coal, a view for which we have found support in the evidence of the erstwhile Planning and Development Department. The representatives of that Department

agreed that a directive as to priority must be given to the Geological Survey of India and that the principal mineral resources of the country should be placed in this order of importance, namely, coal, petroleum, manganese, gold, copper and chromite.

That the need for further work on coal by the Geological Survey of India is realised is apparent from the following extract from the written evidence tendered before us by the Geological Survey of India :—

"The Geological Survey of India propose to investigate these two fields (Kamptee-Nagpur and Pathakhera) as soon as drilling equipment is available, probably by the end of this year. They also propose to take up immediately the question of coking coal in the coalfields of the Central Provinces and the Eastern States Agency. A further examination of the coal-occurrences of Jammu province, Kashmir, is also contemplated in the near future.

"The geological mapping of the Bokaro coalfield is almost completed. Other coal-bearing areas that will, if possible, be investigated further by the Department within the next 10 years are :—

(*i*) The eastern portion of the Raniganj field where the measures are hidden by alluvium. Exploratory drilling will be necessary.

(*ii*) The coalfields of the Eastern States Agency and of Bilaspur district, Central Provinces, especially those within reasonable distances of existing or proposed railways. This work will include geological mapping combined with prospecting.

(*iii*) Possible coal-bearing areas of the lower Godavari Valley, Madras Presidency. Geological mapping and drilling will probably be necessary.

(*iv*) Coal-bearing areas of the southern side of the Assam plateau. This will entail detailed geological mapping and prospecting.

"The above programme will be additional to the work of re-estimating the coal reserves of the principal coalfields in the light of data available since the 1925-30 survey and in conjunction with the proposed systematic chemical and physical survey of the Fuel Research Institute and other bodies. In some instances, geological field work will be necessary but in the main it will be a question of collecting data from collieries, research institutes, etc. and collating the information with the known geological structure. The urgency of this investigation will obviously be influenced by the nature of the recommendations of the Indian Coalfields' Committee and the action taken by Government on those recommendations".

4. Connected with the work of the Geological Survey of India on the occurrence of coal is a study of the characteristics of the individual seams. This is a laborious task but it is of no less importance to sound exploitation. Little has been done and that generally under the control of the Coal Grading Board or at times by the collieries themselves with an eye mainly to the marketing of their output. But we have referred earlier to the extremely limited scope of the Grading Board's activities and the alleged defects of its analysis and mode of expressing the

results of analysis. Attention has also been drawn to the need for a thorough study of the characteristics and qualities of Indian coals with the following main objects :—

(*a*) scientific utilisation of resources through regulation, if necessary;

(*b*) blending, cleaning and washing possibilities on which much of value and importance to the metallurgical industry depends ; and

(*c*) suitability of coals for coking and economic conversion of non-coking into coking coals.

As will be seen, the objects are related also to utilisation and to this extent research on the characteristics of coal is inseparable from research on coal utilisation ; indeed, the object of the former is to facilitate the latter. Under coal utilisation, a number of things require to be studied. We have mentioned earlier the desulphurisation of the excellent coking coals of Assam and have referred in our questionnaires to studies on pulverised and colloidal fuel and briquetting. The last is of considerable importance, for the successful briquetting of our lignites and tertiary coals may help to find for them a readier market. Another aspect of efficient coal utilisation has been dealt with in the ensuing chapter, where we have indicated the need for research on the carbonisation of Indian coals. Investigations on the deterioration of coal on storage and weathering and its preparation for the market are also necessary. Of perhaps less immediate importance in India are studies on the liquefaction of coal and the manufacture of synthetic liquid fuels, but these, too, must be undertaken in due course.

Efficient utilisation demands also a study of consumer requirements and elsewhere we have recommended that Government should share with organised industry the responsibility of determining what classes of Indian coal are the most appropriate for various consumers. But the work is obviously not one that can be undertaken until fuller information about the characteristics of our coals is available.

In relation to coal winning, research is necessary on certain measures of safety, such as the occurrence and treatment of coal dust. Stowing in all its aspects must be investigated further in view of the wide extension of stowing that we have recommended ; under this we would include investigation of the suitability of stowing materials other than sand.

5. We summarise below the problems on which research in India should be concentrated initially. We have arranged them in what we consider should be the order of priority of the work, but we would explain that, as far as possible and without adversely affecting the first three problems which we consider to be of immediate and very great importance, there should be a simultaneous study of all matters.

(*i*) characteristics and qualities of Indian coals,

(*ii*) cleaning, washing and blending of coal,

(*iii*) suitability of Indian coals for the manufacture of metallurgical coke,

(*iv*) carbonisation with particular reference to low temperature distillation and the manufacture of soft coke,

(*v*) study of industrial coal consumption, including that of the railways,

(*vi*) desulphurisation of coal,

(*vii*) safety measures,

(*viii*) briquetting and pulverised and colloidal fuels, and

(*ix*) stowing in all its aspects.

Later should come questions such as the deterioration of coal on storage and weathering, the preparation of coal for the market, liquefaction of coal, the manufacture of synthetic liquid fuels and the gasification of coal *in situ*.

6. We have given first place to a study of the characteristics and qualities of coal, as it is the pre-requisite to all other investigations including the classification of the country's resources according to quality. We are advised that this study must comprise:

(*a*) a preliminary physical and chemical survey, including

(*i*) proximate analysis,

(*ii*) coking properties,

(*iii*) total sulphur,

(*iv*) calorific value,

(*v*) carbon and hydrogen content,

(*vi*) washability, and

(*vii*) reserves ; and

(*b*) a detailed survey embracing in addition to the above

(*i*) distribution of sulphur,

(*ii*) phosphorus in ash,

(*iii*) composition of ash,

(*iv*) total chlorine,

(*v*) complete ultimate analysis,

(*vi*) complete low and high temperature assay (Gray-King),

(*vii*) agglutinating index,

(*viii*) swelling index,

(*ix*) fusion point of ash in a reducing and oxidising atmosphere,

(*x*) deterioration of coking coals on storage and weathering, and

(*xi*) rare element content of coal in specific cases.

The detailed survey is a long-term project and in the United Kingdom after nearly 20 years it is only just nearing completion. But while this is essential, attention must be concentrated immediately on the preliminary chemical and physical survey, on the results of which must be based a more positive coal utilisation policy. The limitations of the present situation have precluded us from recommending what, on merits, may be considered desirable or necessary ; but this handicap of ignorance must be removed without any avoidable delay. For this reason, we are strongly of the opinion that the preliminary survey should be completed, in respect of the Bengal, Bihar and Central Provinces coalfields, within the next 5 years.

The Proposed Fuel Research Institute

7. From this angle we have studied the plan for the Fuel Research Institute of India prepared by the Council of Scientific and Industrial Research and sanctioned by the Government of India. Provision is made for an Institute in the Jharia coalfield at a capital cost of Rs. 14 lakhs and an annual recurring expenditure of Rs. 2½ lakhs.

In the capital expenditure no provision is made for pilot and full scale plants for work on coal washing, carbonisation etc. So far as the technical lay-out and staff are concerned, it appears that the Institute will be divided into six divisions as follows :—

(*a*) Physical and chemical survey of national coal resources, including a geological and a chemical section,
(*b*) Carbonisation and bye-products,
(*c*) Chemistry,
(*d*) Gaseous fuels,
(*e*) Physics, and
(*f*) Engineering.

For the Physical and Chemical Survey Division the staff sanctioned is :—

One Assistant Director
One Senior Scientific Officer
One Junior Scientific Officer
Two Scientific Assistants.

We understand that the original plan for the Institute prepared by the Fuel Research Committee provided for a staff in this Division of—

One Assistant Director
Two Senior Scientific Officers
Three Junior Scientific Officers
Six Scientific Assistants,

but that drastic reductions had to be made subsequently on account of the refusal of the Government of India to sanction recurring expenditure on the scale envisaged (Rs. 5½ lakhs). We were unable to obtain a resonable explanation for this curtailment of grants, but it is obvious to us that the decision of Government displays a most imperfect realisation of what fuel research must do in India and how important it is.

8. We have not considered in detail what organisation and staff are really necessary for the divisions of the Institute other than the one dealing with the physical and chemical survey of coal, for we are primarily interested in ensuring that this survey is completed within the next 5 years. After careful consideration, we feel that in addition to the Central Fuel Research Institute, three sub-stations, akin to the Coal Survey laboratories in the United Kingdom, should be set up immediately to deal with the needs of the Raniganj, Bokaro-Ramgarh-Karanpura and Central Provinces fields; the main Fuel Research Station at Digwadih would, in addition to doing other work, deal with the requirements of the Jharia field, and for this purpose, may have to be provided with extra staff, equipment and stores.

It has been suggested to us by an officer experienced in these matters that the technical staff requirements at headquarters and for the two substations in Bengal and Bihar must be on the following scale if the work is to be completed within the period we have in view :—

(*a*) The Fuel Research Institute

One Assistant Director
Two Senior Scientific Officers (1 each Chemist and Geologist)
Four Junior Scientific Officers (2 each Chemists and Geologists)
Scientific Assistants (6 Chemists and 4 Geologists)

(*b*) Raniganj Sub-station.

One Senior Scientific Officer (Chemist)
Two Junior Scientific Officers (1 each Chemist and Geologist)
Six Scientific Assistants (3 each Chemists and Geologists).

(*c*) Bokaro-Ramgarh-Karanpura Sub-station.

One Senior Scientific Officer (Chemist)
Two Junior Scientific Officers (1 each Chemist and Geologist)
Four Scientific Assistants (2 each Chemists and Geologists).

In each case, there would be an adequate complement of laboratory assistants, draughtsmen, etc.

For the Central Provinces sub-station, we think that staff on the same scale as for the Bokaro-Ramgarh-Karanpura sub-station will be needed in view of the extensive area to be covered.

For comparative purposes, we give below a table showing the technical staff suggested in the original plan of the Fuel Research Committee, the staff actually sanctioned and the staff we consider necessary for the completion of the chemical and physical survey with the maximum possible speed.

Post	Original plan	As sanctioned	As now proposed
Assistant Director	1	1	1
Senior Scientific Officers	2	1	5
Junior Scientific Officers	3	1	10
Scientific Assistants	6	2	24

The effect of the revised proposals we have made for the physical and chemical survey division is likely to be an increase in capital expenditure of about Rs. 2½ lakhs and in recurring annual expenditure of about Rs. 2,30,000 over the present sanctioned limits. The money expended will be well spent and we trust that Government will not be parsimonious in this matter.

9. There is one more comment we wish to make regarding the projected Fuel Research Institute. The original plan was drawn up by experienced officers and individuals with long connections with the industry. There is reason to believe, therefore, that it represented what is considered essential for the country's needs. That it should have been truncated for what appear to be purely financial reasons is unfortunate, and we suggest, therefore, that, in considering our limited proposals, Government should take the opportunity of reviewing their previous decision.

The Need For A Cess.

10. While fuel research in other countries has been undertaken by Government and industry jointly and in co-operation, there has been little evidence in India of the desire of the industry to further its own and the country's interests in this matter. It is right in the circumstances that Government should take the initiative, but we think there is ample justification for making the industry share in the cost of research. Many witnesses stated before us that they would have no objection to a cess being levied

or the purpose of meeting a portion of the cost of fuel research. In one country at least that we know of, fuel research is financed by a contribution from Government and the proceeds of a small cess levied on coal mines producing over 20,000 tons of coal per annum. If, on reconsideration, Government accept the original proposals of the Fuel Research Committee and also sanction the further proposals made by us here, the recurring annual expenditure is likely to be in the neighbourhood of Rs. 8 lakhs. We have considered whether, in India, the contribution of industry to research should be on a selective basis as mentioned above, but we think that this will create considerable administrative difficulties. Our proposal, therefore, is that a cess for research should be levied on all producers of coal and that it might, to start with, be fixed at $\frac{1}{4}$ anna per ton of despatches. At the present rate of despatches, this should bring in nearly Rs. 4 lakhs per annum, which is just about half the recurring annual expenditure. The capital expenditure should, of course, be provided by Government as under the present sanction.

We should like to add that, in due course, research on coal must inevitably assume much larger proportions and more money will have to be found. But investments in fuel research are capital investments which show rapidly increasing results.

Conclusions And Recommendations.

(1) We suggest a plan for fuel research in India, arranging the items in order of priority.

(2) **First attention should be paid to a chemical and physical survey of Indian coals, and the survey should be completed within 5 years.**

(3) The proposed Fuel Research Institute is not staffed adqvately for completing this survey in reasonable time. **Three sub-stations must be set up in the Raniganj, Bokaro-Ramgarh-Karanpura and Central Provinces fields and the Central station should be provided with additional staff etc.**

(4) **Government should reconsider its decision as regards the rest of the Institute.**

(5) **The cost of fuel research should be shared by Government and industry and we suggest, therefore, that a cess of 1/4 anna per ton of coal despatched should be levied.**

CHAPTER XXVII

THE CARBONISATION OF COAL

General Considerations.

Of the total cosumption of coal in India of approximately 26 million tons in 1945, only 3½ million tons were processed, about 1¼ million tons converted into soft coke and the remainder burnt as fuel. In view of the many rich elements contained in a lump of coal, the very large quantity burnt as fuel may be considered to constitute extremely wasteful utilisation. Coke, gas, tar, light oils and ammonia obtained in the distillation of coal have a greater value than the raw coal from which they are obtained, but the statement is true only within the limitations of the available market for these products. We know, for instance, that though the pre-war total production of crude tar was about 60,000 to 70,000 tons a year, a considerable quantity was being used as fuel by the steel works, because there was no market for this quantity of tar in India. It is, therefore, axiomatic that the development of a distillation industry can only take place in conjunction with the development of such kindred industries as would create and sustain a market for the products of distillation. Novertheless, in the burning of coal as raw fuel, a waste of valuable bye-products takes place and planning is needed for capturing them and putting them to use in important chemical and secondary industries.

The Various Forms Of Carbonisation.

2. The process of carbonisation subjects coal to destructive distillation and the bye-products resulting there from depend upon the nature of the coal processed, the design of the oven or retort, the temperature and the rate of coking. In India we are familiar with high temperature carbonisation in coke ovens and in horizontal gas works retorts,but the latter represents a very small proportion only of the coal subjected to high temperature carbonisation. The main object of carbonisation in coke ovens is to produce a hard metallurgical coke suitable for blast furnace or foundry use. The coking temperature varies from 900° to 1200°C. and coking time about 14 to 18 hours. The yield of coal tar is only 2·5% by weight or 4 to 5 gallons of coal tar per ton of coal coked (British and American coals yield almost double this quantity). This low yield is attributable to the comparatively poor quality of Indian coals and their high ash content.

Low temperature carbonisation at a temperature range of 450° to 700° C. produces a soft free-burning semi-coke and a comparatively high yield (8 to 13% by weight) of a thin coal tar in which paraffinic compounds are present to an appreciable extent. No large scale experiments have been conducted in India in respect of low temperature coarbonisation.

There is also a medium temperature process which is usually conducted at temperatures round about 800° C. This is associated with the name of H. Koppers of Germany and as it appears to produce an easily combustible smokeless fuel from poorly coking coals, it may provide the answer to the problem of soft coke manufacture being conducted in such wasteful manner at present all over the Jharia and Raniganj fields.

3. We are indebted to Mr. C. J. Fielder, of Shalimar Tar Products Ltd., for the following excellent summary on the carbonisation of coal :—

"There are three stages in the coking treatment of coal :—

(1) *High Temperature Coking.* at 900°C—1300°C, gives a hard non-volatile metallurgical coke a high yield of coke oven gas and a low yield of thick heavy tar.

(2) *Low Temperature Coking or Carbonisation* at 450°—650°C. gives a soft smokeless fuel containing some volatiles, a low yield of rich gas but a comparatively high yield of thin light tar or coal oil.

(3) *Medium Temperature Coking or Carbonisation* at 700°—800°C. has also been developed and gives results intermediate between High Temperature and Low Temperature Carbonisation, the solid fuel conforming to what is generally known in India as soft coke.

"An approximate comparison of the products normally obtained by these three methods of Coking is given below based on results obtained in the U.K.:—

Yields Per Ton Of Coal

	Low temperature 450°—650°C	Medium Temp. 700°—800°C	High Temp.. 900°—1300°C
Coke	0.7 tons High grade smokeless fuel (with 10% volatiles).	0.8 tons Soft Coke (with 5% volatiles)	0.725 tons Hard Coke (with no volatiles).
Gas	4000 c. ft. (750 B.T.U's/c. ft.	6000 c. ft. 630 B.T.U's/c. ft.)	13,000 c. ft. (500 B.T.U's/c. ft.
Coal Tar or Coal Oil .	18 gallons	16 gallons	10 gallons
Light Oil recoverable from Gas	2½ gallons	2½ gallons	2 gallons

"The chemical nature of the Coal Tar resulting from High Temperature coking is quite different from the Coal Tar or Coal Oil produced from Low Temperature Carbonisation. The former is a heavy viscous product containing 60%—70% of solid pitch, is predominantly aromatic containing a relatively high percentage of Naphthalene and Anthracene and a lesser percentage of Phenol and Cresols. High Temperature Coke Oven Tars yield good class Road Tars.

"Low Temperature Tar on the other hand is a more fluid product yielding only 30% of pitch. The oily components are predominantly paraffinic, are comparatively rich in Phenol-Cresols but contain no Naphthalene. The oils can be refined into petrol, diesel oil and other internal combustion fuels. It is on this point that the importance of a Low Temperature Carbonisation industry, to a country dependent on outside sources for such fuels, is often stressed particularly with reference to war time conditions. Low Temperature Tars do not yield acceptable Road Tars.

"Medium Temperature Carbonisation has been developed in ordinary High Temperature Ovens but this process seems to have established itself chiefly in France before the last war. So far as is known it has not been extensively adopted in the U.K. or U.S.A. The bye-product Tar obtained by this process assumes less importance than in the case of Low Temperature Carbonisation, as it is lacking in the lower-boiling oils which yield the petrol fractions.

"The Soft Coke obtained from Medium Temperature Coking would most nearly approach Indian Soft Coke in character."

High Temperature Carbonisation.

4. In addition to the coke ovens associated with the iron and steel industry there are in India half a dozen coking plants, with varied types of auxiliary bye-product plants attached to them. The coke ovens of the steel companies represent, however, the bulk of the carbonisation units a id it will be instructive to consider their coke oven practices in relation to the recovery of bye-products.

We have already dealt with the nature of the coal required for the production of metallurgical coke and have referred to the difficulties resulting from the use of high ash coals. The functions of the layers of coke in a blast furnace have been compared to those of the steel structure in a skyscraper; for the sustenance of the strength needed, suitable coking coals of low ash content and of uniform characteristics are most essential. While a lower ash content is an advantage for efficiency of operation, it is significant that even greater stress is laid on uniformity. A coke with unifrorm ash-content near 15% is said to produce more pig iron than coke with ash varying, for example, between 10 and 15%. While the ash content of the coke has a direct effect on productive capacity—a one per cent reduction in ash is reported to increase the output of iron by 3 to 6%—the uniformity factor of the coke can be substantially increased by installing coal-cleaning plants.

5. The main bye-products obtained at the coke ovens of the steel works until the advent of the war, were crude tar and ammonium sulphate. Owing to the larger demand for toluene and motor fuel, Benzol recovery units were installed at Jamshedpur and Hirapur by the Government of India. The capacity of these units is as follows :—

Benzene	2·1 million gallons per year
Toluene	0 42 million gallons per year
Solvent Naptha	0·10 million gallons per year

There is also a recovery unit at the works of the Bararee Coke Co. installed in 1920 with a capacity of 100,000 gallons per year, and another at Giridih, capacity 37,000 gallons a year. Three other units were ordered during the war by Government but to our surprise we understand that these are still lying unused somewhere in India, awaiting disposal as surplus stores.

From the primary products of coal distillation, such as Benzene, Toluene, Phenol, Napthalene, etc., a large number of intermediates and synthetic products are obtained. These chemicals are of great interest and importance as drugs, antiseptics, dyes, solvents, photographic chemicals, perfumes, and in the preparation of explosives, synthetic resins, etc.

The manufacture of intermediates and synthetic products from the primary coal tar products has not yet been developed in the country. The most important basic material essential for such development is, however, Benzene, which is now available in good quantity. The coal tar intermediates for the preparation of drugs and dyes are common and there should be a close co-ordination in the plans for the development of the manufacture of dyes and drugs in this country. We would refer, in this connection, to the report of the Chemical Panel of the rest while Planning and Development Department which recommended, amongst other things, the installation

of capacity for the manufacture of 30,000 tons annually of D.D.T., requiring about 5 million gallons of benzol. There are other recommendations, too, indicating the need for increased quantities of phenol etc. In view of the importance of the growth of the chemical industry, the Benzol recovery units should be continued in full operation and the three other "packaged" units installed at other coke works and brought into use as soon as possible. The steady availability of Benzene and other products of coal distillation should induce the development of a host of subsidiary chemical industries.

6. For the refinement of coke oven tars, the combined capacity available at the works of the Bararee Coke Co., Shalimar Tar Products and Bengal Chemical & Pharmaceutical Works appears to be sufficient to deal with the present maximum production of crude tar from all the coking works in the country. Indian coal tars are comparatively poor in the more important bye-products, particularly the tar-acids (phenol and cresols) and these are the ingredients of primary importance in the synthesis of a number of antiseptics, drugs and dyes. The main product of coal tar distillation is sometimes loosely described as creosote oil. Heavier creosote fractions yield a mixture of three solid hydrocarbons—anthracene, carbazole and phenanthrene, and the two former compounds are of importance in the coal tar dye industry.

In addition to the important fertiliser, ammonium sulphate, road tars of sufficient viscosity have been developed from high temperature carbonisation tars. The production of road tars in India is now barely 50,000 tons a year and, with an extensive programme of road construction in view, there is need for improving our road tar supply position.

7. The importance of the bye-products of high temperature carbonisation has been well illustrated by the above examples and we suggest that no new battery of coke ovens be installed in the country without a full accompaniment of auxiliary plant for the recovery and refinement of the bye-products of carbonisation. As it is also very essential that the present Benzol recovery units should be operated for full production, the illogical impost of an excise duty on Benzol, equal to that on petrol, should forthwith be abolished, as was done in the United Kingdom several years ago and as was suggested by the Coal Mining Committee, 1937. The removal of this duty will allow these units to operate on a commercial basis and will provide stimulus for the establishment of industries based on the products of these units. Toluene, of course, is the basic material from which the explosive T.N.T. is manufactured, and is therefore one of the chief factors in national defence.

8. While we were investigating the possibilities of using a high ash coal for metallurgical purposes, we were impressed with the need for installing regenerative bye-products ovens for coke making as distinguished from the waste heat type of ovens, or "bee-hive" coke plants where the bye-products of carbonisation are wasted in the air. Our attention has been drawn to a new coke practice called the National Fuels Process which is described in the following terms:—

> "Any size of coal from run of mine to fines can be used since the coal is pulverized and briquetted before being carbonized.
>
> "The carbonized briquettes produced are of extraord nary interest. They are of a dense character weighing about 42 to 47 pounds per cubic foot and having a specific gravity of about 1·25.

This can be compared with bye-product oven coke weighing 33 to 38 pounds per cubic foot with a specific gravity of 0·80 to 0·85 and anthracite weighing 52 to 72 pounds per cubic foot with a specific gravity of 1·3 to 1·42. Due to the absence of graphitic carbon, the briquettes are a free burning, highly reactive fuel. The volatile content of the finished briquette may be controlled to produce either an ideal domestic fuel or a metallurgical coke with less than 1% volatile matter.

Finished briquettes have been stored in the open at New Haven, Connecticut, for several years without showing any appreciable deterioration and any fines produced in the process are returned so that the final product comprises only saleable briquettes."

It is claimed for this process that :

"Coals for the National Fuels Process must have some coking characteristics but it is a demonstrated fact that the process can make dense hard coke from coals which are so weakly coking that it is impossible for bye-product ovens to use them.

"Gas yield somewhat less than from bye-product ovens—7000 to 9000 c.ft. per ton of coal carbonized depending on coal used.

"Coke yield approximately the same.

"Coke is of a much higher density than bye-product coke. Something of the order of 45 to 47 lbs. per cubic foot compared to 33 to 38 lbs. per cubic ft. for bye-product coke.

"Coke is much more reactive because of the absence of graphitic carbon.

"Tar yield about three times the yield from the same coal if used in a bye-product oven."

The claim merits investigation in respect of Indian coals.

Low Temperature Carbonisation.

9. In low temperature carbonisation, the coking temperature ranges from 450° to 700°C. A number of experiments have been conducted in Europe and America, but as an economic process it does not appear to have met with success, principally because of the low price, determined by the competition of other fuels, obtainable for the principal product. The chief product of low temperature carbonisation is a freeburning, smokeless fuel suitable for domestic use, but owing to the high cost of production, it has so far remained a luxury fuel. A great deal of emphasis has recently been placed on the future of this process in India, but it is impossible to state, with our present knowledge of the properties of Indian coals, whether it is likely to be of value in this country. There are, however, certain methods which deserve investigation in India. One of these is the Wisner process, in which the coke produced does not require briquetting, and issues from the retorts in the form of strong, dense balls of up to 6 inches in diameter. This fuel is easily ignitable, essentially smokeless and contains 15 to 18% volatile matter. The raw coal used is cleaned, fine-sized coal which it is difficult to market as such. The process is being used on a large commercial scale in America. Krupps in Germany were known to have discovered a method by which low temperature coke can replace high temperature coke in the manufacture of ferrosilicon. The tar acids produced in this process are very valuable parti-

cularly to the plastic industries. Although the yield of light oil is small, many Indian coals give a considerable yield of tar. The moisture content appears to be an important controlling factor. The following extract from the report of the Falmouth Committee (U.K.) on Low Temperature Carbonisation (1938) may be of interest :—

> "The Committee further examined the claim made by many advocates of low temperature coke that a big development of this process would bring about a much wished for revival in the coal industry. The Committee have to report, however, in this connection, that the conclusions they arrived at were disappointing. In so far as low temperature coke might be used as a substitute for raw coal, very little increased demand for coal would ensue, as it is calculated that only 10 per cent. more coal would be required to give an equivalent amount of fuel and heat value. Representatives of the coal industry itself were very doubtful if any advantage would be gained by that industry if a large increase in the manufacture of coke by low temperature carbonisation were to take place.
>
> "The Committee made a calculation of the results that would ensue if it were possible to secure a large-scale development, and as a result, in their view, low temperature carbonisation must, in the light of existing information, be ignored as a possible major source of indigenous oil supply."

While the experience of other countries is not encouraging, we feel that there is room for research into the properties of various coals in India and their suitability or otherwise for large scale low temperature carbonisation.

10. Another important process with which India is completely unfamiliar is the hydrogenation of coal. This was developed in Germany as a means of making motor fuel from coal. Countries which do not possess natural petroleum resources like Britain and Germany, have spent considerable sums in research on this problem. New uses are developing for coke oven gases, such as in the Fischer-Tropsch process which is a synthetic process coming under the same category as the Bergius hydrogenation process, the object of both being the conversion of coal into oil without the production of solid bye-products other than waxes. In India no experiments have so far been undertaken along these lines with our coals. That the need is great will be obvious from the deficiencies in our natural oil resources. The possibility of combining low temperature carbonisation and the Fischer-Tropsch process is an attractive one. Research in fuel technology has pointed out in other countries the means of using abundant low grade resources and there is no reason why our coals should not yield to similar treatment.

11. We have dealt in Chapter IV with the importance we attach to the more widespread use of soft coke as domestic fuel in India. The present method of manufacturing soft coke in this counrty is described in the following words by the Soft Coke Cess Committee in their Report for the year 1940-41.—

> "Coal is stocked into large heaps, varying from 15 to 20 tons, and ignited through a hole left in the top. The heaps are then covered with a layer of slack, dust coal or ash and allowed to burn for 3 to 4 days until the whole mass becomes ablaze. The object of the process is to drive off most of the volatile matter which, in the form of smoke, is so disagreeable when raw coal is burnt in

an open hearth. Quenching is resorted to when the correct time arrives and the result is a mass of charred coal half-burnt coal or more or less completely burnt coal, technically known in the market as soft coke."

It has been pointed out to us that this is a most wasteful method as, in addition to polluting the atmosphere valuable gases and with them certain condensible products are lost. Although we are aware of the inferior yields of tar and light oils from Indian coals, we see no valid reason that justifies a wasteful use. In the matter of manufacture of soft coke, for which we have advocated an increased target, it is essential that such manufature leads not only to the production of good soft coke which will be acceptable, but also to the capture of such of the gases as may be useful for distillation and use in industry. The possibility of manufacture through medium temperature carbonisation ovens sho ld be energetically investigated. The centralisation of manufacture in a few selected locations may become necessary, but this we consider an advanta as not only would the burning heaps which bolt the coalfields area be redu ed, but the residual gases could be utilised as fuel in certain adjoining industries. The mstter should, therefore, engage the attention of the Fuel Research Institute as soon as practicable.

Conclusions and Recommendations.

(1) **There is urgent need for extending our bye-product recovery operations in high temperature carbonisation and for this purpose both the installed recovery plants and the three unused ones now lying with Government should be put to full use.**

(2) Some of the bye-products of high temperature corbrnisation are valuable raw materials for important chemical industries and **we recommend that the excise duty on Benzol should be removed.**

(3) **No coke-oven batteries should be permitted to be installed in future without a full complement of bye-product recovery plant.**

(4) Without an intensive study of the behaviour of Indian coals, it is impossible to say what the value of low temperature carbonsiation is to the country. **But as it is essential to develop a suitable form of domestic fuel, the matter should be energetically investigated. Improved methods for the manufacture of soft coke possibly on a centralised basis, should also be evolved.**

CHAPTER XXVIII

CESSES AND TAXES

Central And Provincial Cesses Levied.

A number of Central and Provincial cesses are payable on coal and in the following paragraphs brief details are given of the present rate of a cess and the purpose for which it is levied.

Central Cesses.

These are all levied in the form of an excise duty on despatches of coal by rail.

(*i*) Soft Coke Cess levied on soft coke despatched by rail from the Provinces of Bengal, Bihar and Orissa at the rate of 2 annas per ton. The object of the fund created is to promote the interests of the soft coke industry in the three Provinces.

(*ii*) Stowing Excise Duty levied on coal and coke despatched by rail from British India, excluding Assam and Punjab, at 2 annas per ton on coal and soft coke and 3 annas per ton on hard coke. The cess proceeds are applied for promoting sand stowing for safety and for assisting voluntary stowing.

(*iii*) Rescue Excise Duty levied at the rate of 2½ pies per ton on all coal and coke despatched by rail from the Jharia and Raniganj fields. The proceeds are utilised for the maintenance of mines reseue stations in the two fields.

(*iv*) Labour Welfare Excise Duty levied at the rate of 4 annas a ton on coal and coke despatched by rail from the whole of British India. The object of the cess is to constitute a fund for financing welfare activities in respect of the labour employed in the coal-mining industry.

(*v*) Coal Production Excise Duty levied on despatches by rail of coal and coke at the rate of Rs. 1-4-0 per ton. The proceeds are applied for meeting, amongst other things, the cost of war-time bonuses payable to collieries for increased output of coal and the deficits, if any, on schemes for establishing and maintaining labour camps in the coalfields under the supervision of the Central Government.

Provincial Cesses.

Bengal.

(*i*) The Asansol Mines Board of Health Cess levied on

(*a*) all owners of mines on the output of their mines, and

(*b*) all persons who receive any royalty, rent or fine from such mine on the road cess payable by such persons.

The rates are variable and those now in force are Rs. 2-4-0 per 100 tons of raisings payable by the mine owner and 24 % of the local cess payable by royalty receivers. The levy on royalty receivers cannot be strictly termed a levy on the coal industry, though it is probable that some of the mine owners are themselves receivers of royalty. The object of the levies is to provide for the better control and sanitation of mining settlements in the Province.

(*ii*) Local Cess also called the Road and Public Works Cess, payable to the District Board, the proceeds of which are utilised for the

construction and maintenance of roads etc. The present rate of levy is 1 anna per Re. 1 of profits. The cess is levied in respect of land, not merely from the collieries but from all others who derive an income from land, and to this extent is not a levy peculiar to the coal industry.

Bihar.

(*i*) Jharia mines Board of Health Cess, levied on
(*a*) all owners of mines on the annual output from the mines, and
(*b*) on all persons who receive any royalty, rent or fine from such mines on the local cess payable by the persons.

The rates of the levy can be varied and the present rates are Rs. 4 per 100 tons on raisings and 25 % of the local cess payable by royalty receivers. The cess proceeds are utilised for the control and sanitation of mining settlements in the Province and the prevention of the outbreak and spread of epidemic diseases in such settlements.

(*ii*) The Jharia Water Board Cess, the proceeds of which are applied towards the provision of adequate water supplies to the mining settlements in the Jharia field. The cess is leviable both from mine owners and from royalty receivers. The levy from the former is at the rate of 9 pies per ton of coal despatched during the preceding calendar year and from the latter at 5% of the royalty received during the preceding calendar year. There is also a water rate payable on the water consumed.

(*iii*) Local Cess, also called the Road and Public Works Cess, recoverd by the District Board at the rate of one anna per Re. 1 of profits and 5 pies per ton of despatches.

(*iv*) Chaukidary tax varying from Rs. 27-8-0 to Rs. 110 per annum according to the number of houses in a settlement.

Other Provinces.

No cesses are levied except in the Central Provinces where a coal tax of 3 pies per ton of coal and coke is levied in the Chhindwara District.

Indian States.

Full details of the cesses levied are not available though it is known that there are corresponding provisions in some of the States for the levy of a Production Cess, a Labour Welfare Cess and a Stowing Cess.

Reasonableness Of The Central Cesses.

2. All the Central cesses are levied for specific and distinctive purposes and all, barring one, have no duplication with the Provincial cesses. The exception is the Labour Welfare Cess, some of the objects of which overlap those of the Mines Board of Health levies in Bengal and Bihar and the Jharia Water Board of Health cess in Bihar. There can be a duplication of activities to the extent that the Central Government's schemes for labour welfare embrace the provision of better sanitary and medical facilities and improvements in water supply to the coalfields. We understand that attempts are being made to co-ordinate the work of the various bodies and that as regards water supply for example the Labour Welfare organisation proposes to assist by way of grants to the Jharia Water Board. The Mines Boards of Health have duties, such as the collection and maintenance of vital statistics and the control of epidemics, which are not even remotely

connected with likely activities of the Central Government's Labour Welfare organisation. But there is, nevertheless, a definite overlap in the objectives of the Central and Provincial bodies in relation, for example to anti-malaria work and hospitalisation. We have doubts whether this duplication is desirable, at least from the administrative point of view, and whether double taxation for similar purposes is justifiable. On the former point, we had an interesting discussion with representatives of the Bengal Government and there is reason to fear that harmonious action may, at times, be difficult to secure. Our purpose in saying this is to suggest that the possibility of unifying action and administration in relation to similar objects should be explored. In the legislation enacted by the Provincial Governments for the coalfields' areas, there is recognition of the special requirements of mining settlements in certain matters and we do not believe that there can be any real objection on merits to extending this recognition in the manner suggested. Indeed there is need for uniformity of activity over an essentially homogeneous area.

3. We have two other comments on the Central cesses. Few will question their need or the reasonableness of the first four. As a matter of fact, we have, following the present pattern, suggested an increase in the Stowing Cess to 8 annas per ton of coal (and 12 annas per ton of coke) immediately and, after a period, a further increase. We have also recommended a new cess for research and we note that under the Government of India Act, 1935, this can probably be levied by the Central Government under item 12, List I of the 7th Schedule.

4. The Coal Production Cess was introduced towards the end of 1944 for financing the Central Government's activities in regard to the war-time production and distribution of coal. The principal items of expenditure met from the cess fund are the cost of the administrative machinery, the bonuses payable to collieries under a war-time scheme which ended on the 31st March 1946, and the deficits on Gorakhpuri labour and on open cast mining. It is unlikely that the Gorakhpur labour supply scheme will be continued for long, at any rate in the present subsidised form. The losses on open cast mining will also have been probably met by the end of the present financial year and it is, therefore, for consideration whether the Production Cess needs to be continued.

From the limited view point of the purpose for which this cess was instituted, there does not appear to be any reason for its continuance. We, have, however recommended a much larger control by Government over matters relating to the coal industry. In a later chapter, where we recommend the setting up of a separate organisation for such administrative and executive control, we have emphasised the need for providing to that organisation a sufficiency of regular funds; and in this context we have suggested that the proceeds of the present coal production cess, on a modified basis, might form a suitable source for such funds. If, after examination, it is considered inexpedient or impracticable to levy such a cess and to allocate its proceeds to the organisation, we are of the opinion that the Coal Production Cess should be abolished as soon as all deficits on schemes initiated in pursuance of war-time policy have been met and, in any case, by the end of the current financial year. The coal bill of consumers has gone up very steeply in recent years and any reasonable relief that is possible should be given promptly.

Examination Of The Basis Of Provincial Cesses.

5. Turning now to the Provincial cesses, it appears that the Mines Boards of Health and the Jharia Water Board cesses are levied on raisings or despatches, as the case may be, in the immediately preceding calendar year, and

for this purpose annual and monthly returns are provided. The amounts are presumably recovered in arrears and in the manner prescribed for land revenue. We note from the available annual reports of the various Boards that considerable amounts remain unpaid at the close of an year; these can, of course, be recovered by coercive processes, as in the case of land revenue, but the fact does throw into relief the defect of the system in comparison with that adopted for Central cesses. But the Central system cannot be applied in these other cases, because the latter, with one exception, are, levied on raisings and not on despatches by rail.

6. This naturally emphasises the administrative undesirability of levying a cess on raisings. We are, of course, not referring, for the moment, to the cesses payable on profits. The Jharia Water Board Cess is levied on despatches, apparently by road as well as by rail, and the Jharia and Asansol Mines Boards of Health tonnage cesses are levied on raisings. We find rather surprisingly that in the same Province both systems are in vogue. It is true that a cess on raisings covers a larger quantity of coal but there would undoubtedly be inaccuracies, may be sometimes of a serious nature; and this would apply also to despatches by road. The system is, therefore, liable to abuse. On the whole, there is a definite advantage in levying and collecting the tonnage cesses on despatches which can be more accurately determined. No change in the incidence of the levy is, however, recommended. If necessary, the rates could be slightly enhanced so as to bring in the same approximate revenue on a smaller quantity of coal; and if any revision is undertaken, we recommend also reconsideration of the rate of taxation in the light of our proposal for unified administration of certain matters in the coalfields areas.

7. Much criticism has been voiced before us about the propriety and the basis of the Road and Public Works cess, which, in the case of collieries, is levied on profits (and also on despatches in Bihar), and the decision of the Central Government to treat the impost as a tax on income not to be allowed as an item of Revenue Expenditure for income tax purposes. Arguing that the road cess is definitely discriminatory against the coal indsutry, the Indian Mining Federation and the Indian Colliery Owners' Association have stated as follows:—

> "Coal by no means can be considered as a produce of the soil, however much we may stretch the meaning of the term, for coal, once mined, is lost for ever, there being no fresh growth to replace it. In any case, the imposition of this cess on the Coal Industry alone cannot be defended on any ground. A protest on this score was made by the Federation Committee about 25 years ago but their representation was turned down both by the Bengal and Bihar Governments, which evaded the issue of principle by stating that the cess had been imposed by a decision of the then Secretary of State for India".

As regards the basis of the levy, we reproduce the following comments of the Indian Mining Association :

> "Calculated on the average for the previous three years, Road Cess is payable in Bengal at one anna in the rupee on profits and in Bihar at one anna per rupee on profits plus a cess on despatches. The hardship of calculating this tax on profits, at times when profits are falling, is obvious.
>
> "It may, of course, be argued that the industry gains when profits are rising. This cannot be denied but it merely serves to emphasis the ineptness of a tax which so works that when profits are rising the rate of tax is lower than when profits are falling.

"The assessment on profits of companies varies from one district to another and is carried out in a most arbitrary fashoin.

"There is a definite anomaly and as the cess is for the improvement of roads it should be borne equitably by all and there is a strong case for the Act to be amended to allow the collection of cess on despatches instead of on profits. This would simlify calculations, lesson the possibility of evasions and allow for an assured income. "

The Bengal Government have informed us that there is no doubt about the legality of the cess in reference to the coal industry. Whatever be the legal position, the cess on profits has been represented to us as being akin to income-tax; and there is a further element of injustice in that the determination of profits is left to the discretion of the District Collector. We are not in a position to comment on the technical issues involved but in any case we consider that the profits on which the cess is levied should definitely be the profits as determined by the income-tax authorities.

The Indian Mining Association's suggestion that the cess should be levied on despatches seems to ignore the fact that it is a general levy and not peculiar to the coal indusry alone. We are not certain that a differentiation in the method of levy is possible as between different classes of citizens, but if it is, we agree that a levy on despatches in respect of the coal industry would be far preferable from all points of view.

The Central Government's decision regarding the inadmissibility of road cess payments in reduction of profits for purposes of income tax is apparently legally sound and no cogent reasons, save that it will benefit the coal producers, have been advanced for a concession. We are, therefore, unable to recommend any.

Unification of Cesses.

8. We have considered whether all the Central and Provincial cesses can be unified, *i.e.*, pooled and collected by a single agency, without prejudice to the respective tax jurisdictions of the Central and Provincial Governments. Unification is possible only if the basis of levy is uniform and if the incidence of all the cesses is on the same party. It is doubtful whether this uniformity can be secured in respect of the local cess and the cess payble by the royalty receivers which is a percentage of the local cess. Moreover, the incidence of Central cesses is on the Consumer and of the Provincial cesses on the producer. Consequently, the question of unifying the Central and Provincial cesses cannot arise. The question of unifying the Provincial cesses is a matter for the respective Governments to consider. Here we shall confine ourselves to a consideration of the unification of the following Central cesses :

(*i*) Soft Coke Cess
(*ii*) Stowing Cess
(*iii*) Mines Rescue Cess and
(*iv*) Labour Welfare Cess.

It must be noted first that the Central cesses are not of uniform applicability; the Soft Coke Cess is levied only in Bengal, Bihar and Orissa; the Stowing Cess in Provinces other than Assam and the Punjab; and the Mines Rescue Cess only in the Jharia and Raniganj fields. An amalgamated Central Cess applicable throughout British India has, therefore, to be ruled out under existing circumstances.

It might be asked whether there is no need for uniformity of taxation throughout the country. The answer must depend on the circumstances in the different Provinces and also on whether the present variations cause hardship. Soft Coke manufacture is concentrated to an overwhelming degree in Bengal and Bihar; and in our view, this must continue to be the case because of the abundance in these fields of inferior grades of coal and because the output of other fields is put to better use as coal for industrial purposes. Sand stowing is of no significance in the Punjab, Baluchistan and Assam and we cannot, in reason, levy a stowing cess in these areas. The Mines Rescue Cess is for the specific maintenance of rescue stations and when these are eventually established in other large coal producing areas, such as the Pench Valley and Karanpura fields, the cess could reasonably be extended to those areas. For another reason, too, we would discountenance a uniform Central cess made up by an amalgamation of the present four cesses; the cost of production in the Punjab, Baluchistan and Assam is high in comparison and the present differentiation in the matter of cesses provides, though perhaps to a small extent only, a cost concession to the consumer. On the other hand, the absence of the levy in these Provinces does not place the producers in other Provinces at a competitive disadvantage.

The advantage of unification is the facility of collection, but the proceeds will eventually have to be distributed to the various organisations, in any case. Even if all activities are brought under the control of one organisation—and this is not recommended by us in respect of mines rescue and labour welfare—there is much advantage in keeping unrelated activities separate in the matter of finance and accounting.

There is one small point about the collection of Central cesses by the railways. A deduction, at varying rates for the different cesses, is made by the railways as remuneration for the services rendered. but there is reason to believe that the deduction is a source of undue profit. We recommend that the matter may be examined with the object that the commission charged covers no more than the actual extra expenditure incurred plus a small fee.

Central Taxation.

9. We have been informed that the coal-mining industry is severely handicapped by

(*a*) insufficient depreciation to meet the present high costs of plant, machinery, buildings and development and

(*b*) the lack of depriciation on mining rights in the matter of income tax.

With regard to (*a*), the Central Government granted special depreciation rates as a concession designed to stimulate production by the installation of new plants, etc., during war-time. The details of the concession are as follows :

> "A special depreciation at the rate of 50 per cent. perannum on the written down value will, for the purpose of income tax and excess profits tax, be allowed in the case of coal mines, on all items mentioned in Rule 8 of the Income Tax Rules, subject to the following conditions :—
>
> (*a*) the special depreciation will be admissible on all items necessary for maintenance or increase of coal production (installed after January,

1944). Items of stores required by way of replacement will not be eligible for this depreciation but the concession will apply to case in which (i) owing to expansion of a 'district'in a mine, new shafts, new haulage, etc. are necessary if output is not to fall, and (*ii*) it is proposed to put new machinery in an existing pit and to transfer existing machinery to a new pit ;

(*b*) it will only be allowed in cases certified before the (30th June, 1945) by the Coal Commissioner with the concurrence of his Financial Adviser as entitled to the concession.

* * * * *

(*c*) it will be admissible for a period of two years from the date of bringing the items concerned into use. After this period the normal rates of depreciation will apply, but in no case will the special depreciation be allowed after the 31st March 1950".

The Indian Mining Association have stated that " much of the effectiveness of these concessions has been lost through their being operative up to March, 1950. Much of the machinery and plant already ordered at high prices will, through delay in delivery, not be put to use before 31st March 1948, and will, therefore, not qualify rqualify only in part for the special depreciation. If this is to be avoided, Government must allow a sepecial depriciation to apply to all items which have been certified irrespective of the date when they are put in use". The special rates of depericationwere sanctioned as a war-time concession to assist in all possible ways towards an improvement in output. A good proportion of plant and machinery replacement in war-time at inflated costs was necessitated by the failure of mineowners to make replacements in proper time before the war. In the matter of depreciation rates for the coal industry, we are not convinced that there is justifiction for extending the duration of the concessions granted, unless something similar is done, as a matter of high policy, in respect of newly installed plant and machinery in other industries also. That such a concession will be of direct benefit to coal production is undoubted, in view of our recommendation that fresh development on which a start must be made almost immediately should, as for as possible, be mechanised, and the cost of plant and machinery continues to be high.

10. As regrads the depreciation on mineral rights, the case is stated by the Indian Mining Association as follows :—

"A very large proportion of the industry's capital expenditure is represented by the cost of purchasing mineral rights. The cost of these mineral rights has been steadily rising until now a stage has been reached whereby a large proportion of a Company's capital is represented by a wasting asset the decrease in which is not allowed as a charge against profits for taxation purposes. The Committee are strongly of the opinion that until provision is made for amortization of mineral rights as a charge against profits for taxation purposes this factor represents a very real influence against the efficient development of Indian coalfields

"It is well-known that India's shall ow coal seams are becoming exhausted and that it is becoming increasingly necessary to work the deeper seams. This of course means that the cost of extracting coal will increase progressively and unless provision is made now to meet the contingency

there is a very real possibility that Companies will not possess the funds to work these deep seams or that the cost of working these seams will be uneconomic.

"If this is to be prevented the coal industry must now be provided with the means of setting aside funds for the development and working of these deeper seams when the time comes. There are several ways in which this can be done but the Committee consider the most satisfactory would be the granting of a special rate of depreciation, say, 5% on the mineral rights.

"The Committee consider that steps on the lines of the foregoing would go a long way to meet the present alarming practice to work shallow seams without thought to the necessity of providing for the working of deeper seams when all shallow seams are exhausted."

There are parallels in the U.K. and the U.S.A., the details of which have been furnished to us by a firm as follows :

(*a*) *U.K. Income Tax Act 1945.*

"This Act is the first step towards giving some relief to industry in respect of the depreciation of certain *wasting assets.*

"Part III of the Act deals with an allowance in the extractive industries, *e.g.*, —mines and other sources of mineral deposit of a wasting nature. The intention is to write off the cost of Capital assets whose life is limited by the life of the deposits in the mine.

"Capital expenditure which is incurred in connection with working mines, etc., exploration, development and the construction of works which are likely to be valueless when the deposits are worked out is to be subject to an *initial* allowance of 10% and an *annual* allowance calculated according to a formula and that formula is to be based on output with a maximum period of 20 years.

"The expenditure which qualifies for the annual allowance must be of the same kind as that which qualifies for the initial allowance, with one variation. For the purpose of the *initial* allowance the works inquestion must be likely to have little or no value to the claimant when the source is no longer worked but in the case of the annual allowance it seems that this requirement is not essential. But the expenditure ranking for the annual allowance must have been incurred for the 'purpose of the trade and in connection with that source.'

"The allowance came into force after 6th April 1946 and the expenditure must have been incurred on a 'basis' (accounting) period after that day."

(*b*) *U. S. Internal Revenue Code.*

"In arrivimg at the taxable profits, the U.S. Treasury Department recognises the rights of tax-payers who possess economic interests in mineral deposits to claim as a deduction from their incomes from these deposits, an allowance for depletion.

"An economic interet is defined and any interest in property which does not come within the definition cannot be made the subject of a claim for depletion.

"In the case of coal mines the allowance for depletion is calculated as 5% of the value the coal sold either in its crude state or after processing. From the sale value of the coal there must be deducted any rents or royalties paid in respect of the property and before the 5% allowance is calculated. The allowance for depletion as calculated above is limited to 50% of the 'net income' from the property which may be regarded as the net profits, after deducting all working and other expenses which are allowable deductions, for the purposeof arriving at the income tax liability."

That coal is a wasting asset and that an amortization fund is essential will not be disputed and we consider that the above request is very reasonable and merits the serious consideration of Government.

Conclusions And Recommendations.

(1) It should be considered whether a unification of health, medical and water supply arrangements in the coalfields can be secured.

(2) The Coal Production Cess should be abolished by 31-3-1947 unless it is proposed to use the cess for the other purpose indicated by us. In the latter event the rate should be reduced.

(3) The Provincial cesses should be based on despatches where possible but still collected by the Provinces from producers.

(4) Each Province should examine the possibility of unifying all its cesses.

(5) A unification of Central cesses is not practicable.

(6) We cannot recommend that the period of validity of the special rates of depreciation allowed on plant, etc., should be extended for the coal industry alone, but if any such concessions are granted generally, they will considerably facilitate mechanisation and new development.

(7) Favourable consideration should be given to the request for an amortization allowance on mineral rights.

CHAPTER XXIX

MISCELLANEOUS MATTERS.

Technical Training

Throughout our tours of the vaious coalfields, we have been impressed with the shortage of technical personnel, particularly as regards senior supervisory staff and also machine operators. We feel that unless prompt steps are taken to remove this shortage, the expansion of the coal industry in India will be held up.

2. Supervision of mines is generally on the following basis. Large Managing Agency groups usually have a Chief Mining Engineer, or General Manager, or Superintendent, who is in charge of the whole group, and is usually assisted by deputies and other staff such as surveyors and a zamindari department. Below the Chief Mining Engineer and his office come the Agents of groups of collieries in the same area, each Agent being responsible for supervising the Managers of the collieries in his charge. Then come the colliery managers and we would point out that, under the Mines Act, every mine must have a manager who is responsible for seeing that the mine is worked in accordance with the provisions of the Act and the rules and regulations made thereunder. In the case of mines with an output not exceeding 600 tons per month, the manager must have a permit issued in accordance with the Act but need not have a Mine Manager's Certificate of Competency ; for mines above this output and not exceeding 2,500 tons per month, the manager must have a Second Class Certificate of Competency, and for mines with an output of over 2,500 tons per month, the manager must have a First Class Certificate of Competency. Under the manager, there may be one or more assistant managers who usually have a Certificate of Competency, or in some cases, a Sirdar's Certificate, and under the assistant managers are the overmen, who must have a Sirdar's Certificate and sometimes hold a First or Second Class Mine Manager's Certificate of Competency. Below the over men come other trained personnel such as Sirdars, who must possess a Sirdar's Certificate, and shot firers, who must have a Shot Firer's Certificate.

3. We shall deal first with the supervisory staff, *i.e.*, those possessing a Mine Manager's Certificate. These certificates are granted on the results of examinations for competency held under the regulations of the Mines Act, and the two principal training schools are the Indian School of Mines at Dhanbad and the Hindu University at Benares. The minimum qualifications to sit for the entrance examination to the Indian School of Mines is the passing of the Intermediate Science examination. The course is a three-year one for a Mining Certificate and a four-year one for a Diploma, and the School at present accepts about 20 students anually. The course at the Benares Hindu University is a three-year one and the degree of Bachelor of Science is granted to successful candidates. Having obtained either the Mining Certificate or a Diploma, or a B.Sc. (Benares), it is then necessary for the candidates to have two years' practical experience before they can obtain a Second Class Mine Manager's Certificate, or three years' practical experience for a First Class Certificate, provided they have not already had such experience before taking these qualifications. Those who have had five years' practical experience can sit for a First Class Certificate without passing through the Indian School of Mines or the Benares Hindu University, and quite a number of can-

didates from the coalfields obtain their certificates in this way through the medium of evening classes run by the Provincial Governments of Bengal and Bihar and one or two of the large coal companies, or by correspondence courses.

4. We understand that it is proposed to expand the Indian School of Mines in order that about 60 instead of 20 students can be admitted annually, and in view of the likelihood of expansion in the coal industry and the fact that even with existing production there is at present a shortage of qualified mine managers, we recommend that the School of Mines should be expanded to this extent at as early a date as possible. We would point out that mining is already a most important industry in India and is likely to become even more important, and that the profession of mining engineer, therefore, offers almost certain employment and the prospect of an interesting and well-paid career to the educated youth of the country, and that this fact deserves wider recognition.

5. We have heard complaints that students who have obtained their Mine Manager's Certificates are, in certain cases, somewhat deficient in some of the practical aspects of mining. We know that this is receiving the attention of the authorities and we consider that it is important that steps should be taken to see that the fullest consideration is given to practical experience, since mining is, after all, essentially a practical profession in which experience is of primary importance. In this context, we would draw attention to the importance of ensuring that mining students are, in future, given practical training in the use of machines for cutting and conveying coal underground, since it seems likely that machines will be increasingly used in India, and it is, therefore, necessary for those in charge of mines to have a thorough knowledge of how all types of machines should be operated.

6. This brings us to the second point which we wish to emphasise in connection with the training of technical personnel. It is no use relying on an increase in production through an increase in the use of machines for coal cutting and loading, unless trained operators are available to work the machines ; and, according to our information, even the coal cutting machines at present in use in India are not being worked to the best advantage for want of properly trained personnel. This difficulty was experienced in the United Kingdom and, in order to provide the necessary training for macnine operators, special courses were started at Sheffield University and have, we believe, proved very successful. Centralised courses of this nature are necessary beacause of the various makes of coal cutting, loading and conveying machinery, all of which can be studied at a central course, whereas only individual makes can be studied by operators trained by the manufacturers themselves. We feel that there is an urgent necessity for similar courses to be started by Government in the major Indian coalfields ; and we think that it would be advisable for Government to arrange to send three suitably qualified men at once to Sheffield to attend a course in order that they may learn to be instructors, with the intention of starting training centres, in the Jharia, Raniganj and Pench Valley fields for training machine operators. The minimum qualification which we would suggest would be a First Class Mine Manager's Certificate and, so far as this can be assessed, some degree of ability as a lecturer or instructor. When the results of this experiment can be seen, it may be found worthwhile to send further qualified men to Sheffield in order to expand the scheme, but progress along these lines will have to be guided by the experience gained in the first stage. We think also that some

of the big Managing Agency groups would probably find it in their interest to make similar arrangements on their own account, and this would have the advantage not only of helping to increase the number of skilled machine operators but also enable such groups to concentrate their training on the particular makes of machines which they most favour. We understand that plans of this nature are already under consideration by at least two of the big groups, and we trust that they will be implemented, since the value of machine mining is dependent upon the necessary skilled personnel and this skilled personnel can only become available if positive steps are taken towards training them.

7. As regards overmen, sirdars and shot firers, special classes of instruction are run by the Provincial Governments of Bengal and Bihar and one or two of the big coal companies, and we understand that the training provided is adequate and that there is, generally speaking, a sufficiency of this type of trained personnel.

Acquisition Of surface Rights For Colliery Purposes.

8. A matter to which considerable importance attaches is the acquisition of surface rights for colliery purposes. We are not aware of the position as regards this in Indian States, but in the non-Permanently Settled Areas of British India, colliery owners may either negotiate for purchase with the owner of the surface or, within the limitations of the Land Acquisition Act in so far as it is applicable to this purpose, apply to Government for acquisition. In practice, however, procedure under the Land Acquisition Act is beset with a number of difficulties. A colliery purpose may not be considered to be a public purpose under Section 4 of the Act save to the extent of the provisions of Part VII of the Act which deals with acquisition for companies. Under section 40 land may be acquired for a colliery employing not less than 100 persons, if it is needed for the erection of dwelling houses or the provision of amenities for the workmen or for the construction of some work which is likely to prove useful to the public. The acquisition of land for other colliery purposes is not strictly covered by the Act, though, as the Bihar Government have stated in their reply, the Act could be utilised " so long as coal production is of vital importance". Presumably, under such circumstances, a colliery purpose can be considered to be a public purpose, though the matter may be a source of controversy and the subject of different interpretations by different provinces.

A further complaint against proceedings under the Land Acquisition Act is that they often become unduly protracted ; but as regards this, the evidence before us suggests that the normal period for handing over possession is about six months and that frequently much less time is taken. Land acquisition without the consent of the owner is a serious interference with the enjoyment of private rights and compulsion should undoubtedly adopt a procedure that not only does justice but also appears to do justice. Considerable difficulties in this matter can be avoided by foresight on the part of the collieries and, in any event, cases of urgency are adequately covered by Section 17 (1) of the Act.

9. In the Permanently Settled areas of Bengal and Bihar yet another device is available to collieries. Section 84 of the Bengal Tenancy Act and Section 50 of the Chota Nagpur Tenancy Act enable the acquisition of surface rights in certain circumstances. The substantive portions of these Acts are reproduced below for ready reference:

Section 84 of the Bengal Tenancy Act.

"A Civil Court may, on the application of the landlord of a holding, and on being satisfied that he is desirous of acquiring the holding or part thereof for some reasonable and sufficient purpose having relation to the good of the holing or of the estate in which it is comprised, including the use of the ground as building ground, or for any religious, educational or charitable purpose,

and on being satisfied on the certificate of the Collector that the purpose is reasonable and sufficient,

authorize the acquisition thereof by the landlord upon such conditions as the Court may think fit....."

Section 50 of the Chota Nagpur Tenancy Act

"....the Deputy Commissioner may, on the application of the landlord of a holding,

and on being satisfied that he is desirous of acquiring the holding or any part thereof for some reasonable and sufficient purpose having relation to the good of the holding or of the tenure or estate in which it is comprised, such as the use of the land for any charitable, religious or educational purpose, or for the purpose of mining, manufacture or irrigation, or as building ground for any such purpose or for access to land used or required for any such purpose,

and after such inquiry as the Deputy Commissioner may think necessary, authorize the acquisition thereof by the landlord upon such conditions as the Deputy Commissioner may think fit...."

There is a legal point to be explained about these provisions. The sections refer to the acquisition of a "holding" which is land held by a raiyat or underraiyat who does not enjoy undergound rights; they are inapplicable to land held by tenure-holders. In practice, therefore, Section 84 has been little used in Bengal where, we are informed, the land is held more often by tenure-holders than by raiyats. The position as regards ownership of the surface seems slightly different in Bihar, since cases of summary acquisition under Section 50 of the Provincial Act have been fairly numerous. Though the situation here is definitely easier, the fact must be noted that applications for acquisition must originate from the landlord unless the colliery also owns surface rights by virtue of a lease. This has, on occasions, led to difficulties, for a landlord may not extend his co-operation.

Apart from the point already mentioned about the Bengal Tenancy Act, there is yet another complication. While the Chota Nagpur Tenancy Act refers specifically to acquisitions for mining purposes, there is no such mention in the Bengal Act and it has been suggested that Section 84 cannot extend to use for colliery purposes, as coal-mining is "destructive of a holding and in a sense of the estate". We note, too, that the Bengal Act introduces the unnecessary dual authority of the Collector and the Civil Court.

Dealing with Section 84 of the Bengal Tenancy Act, the Coal Mining Committee, 1937, recommended that an amendment should be undertaken so as to bring it in line with Section 50 of the Chota Nagpur Tenancy Act. We understand that the Bengal Government considered the time (1938) inopportune for sponsoring the amendment and we are not aware that the question has since been reconsidered. If the position really is that, even after amendment, the Act will be of little value in Bengal, because of the ownership of land by tenure-holders generally, the matter need not enagage further attention, but we think that an investigation is desirable.

10. As we have suggested earlier, a defect in the Tenancy Acts to which collieries attach considerable importance is that action must always be taken through the landlord. The Tenancy Acts seek to regulate the relations between landlord and tenant, and we cannot advocate any amendment designed to give collieries the power to apply direct for acquisition.

On the whole, existing difficulties, not merely confined to the Permanently Settled Areas, can be removed only by a general use of the provisions of the Land Acquisition Act. In our opinion, the object can be secured by an amendment of Section 40 of the Act (and consequential amendments to Section 41) designed to include amongst approved purposes uses such as for dumping overburden spoil from open cast working, depillaring operations, construction of huts for temporary labour and any others that may be considered essential for efficient colliery operation. We have recommended elsewhere large-scale development of coal mining in virgin and other areas and serious difficulties in acquiring essential surface rights will undoubtedly be a retarding influence. If the vital importance of coal-mining is recognised, there will, we think, be little hesitation in undertaking the necessary legislation.

Coal Statistics.

11. In Chapter XXIV we referred to the need for collecting certain statistics essential for securing efficient distribution. But Coal statistics have a wider scope and greater value. Unfortunately, the statistics as maintained in India are incomplete and defective in some respects, and during our investigations, we have been handicapped at many stages by the lack of reliable data. The publication "Indian Coal Statistics" contains discrepancies and the statistics themselves seem to be Compiled without a proper idea of the functional use of figures. Throughout our report we have indicated the need for a keener interest by Government in the affairs of the industry. But this cannot be secured effectively unless the growth of the industry is accurately and fully recorded in figures, in a manner that is both intelligible and interesting. Statistics furnish the most logical and effective background for policy and executive decisions, particularly in reference to an extractive industry. Besides, accurate statistics will provide individual operators with information which will assist in determining their course of action. It is necessary, therefore, that the Department of Fuel and Power we propose in the next chapter should create a section dealing with coal statistics, which should be compiled and maintained on modern lines.

12. The scope of the statistics needed in any particular case is determined by the activities of an industry and its inter-relation with other industries. In regard to coal, primary importance attaches to its production, distribution and use ; but as coal is only one source of power, its position in relation to the entire power position should be of interest.

We have carefully studied the forms in which coal statistics are compiled in a number of countries and consider that the most effective presentation is to be found in the U. S. A. Apart from complete details, excellent graphs and charts are incorporated in the annua lvolume of statistics[1] is and we think that the system bears reproduction in this country.

There would, of course, be adaptations for Indian conditions, and we think that something on the following lines might be suitable :

1 Bureau of Mines, U. S. Department of Interior's Mineral Industry Survey on Bituminous Coal.

Production

(*a*) For the country as a whole annually from 1901, including number of mines working.

(*b*) By Provinces and States separately for the year under report and preceding nine years.

(*c*) For the year under report month by month
  (*i*) for the country as a whole, and
  (*ii*) by Provinces and States separately.

(*d*) Good coking coal output monthly for the year under report.

(*e*) Number of mines working during the year by Provinces and States separately.

(*f*) Classification of mines according to output, annually, for the country as a whole and by Provinces and States separately.

(*g*) Stocks at pithead at the end of each month for the country as a whole and by Provinces and States separately.

Distribution

(*h*) Consumption of principal consumers for the year under report and the preceding 9 years.

(*i*) Despatches monthly to principal consumers during the year under report.

(*j*) Despatches to different Provinces and States from each producing Province and State during the year under report.

(*k*) Effects of fuel economy on coal consumption of certain principal consumers as compared to a base period.

(*l*) Monthly despatches of good coking coal for the year under report.

(*m*) Power generation for the year under report from coal, oil and water.

(*n*) Monthly loadings of wagons from each coalfield.

(*o*) Coastwise coal shipments monthly for the year under report port by port.

(*p*) Stocks of coal at the end of each month of the period under report with principal consumers; stocks of good coking coal being shown separately.

(*q*) Annual colliery consumption for
  (*i*) power purposes,
  (*ii*) fuel for colliery labour, and
  (*iii*) coke manufacture.

Price

(*r*) Average f.o.r. colliery prices for the year under report and previous 9 years for
  (*i*) the country as a whole, and
  (*ii*) by Provinces and States separately.

(*s*) Value of coal produced during the year under report in
  (*i*) the country as a whole, and
  (*ii*) by Provinces and States separately.

Mining Practices

(*t*) Quantity of coal mined in the year in each coalfield by
  (*i*) hand,
  (*ii*) machine-cutting, and
  (*iii*) open cast work.

(*u*) Number of machines in use during the year under report and average output per machine in each coalfield.

(*v*) Number of mines worked open cast, and shovels working, in each coalfield.

(*w*) Quantity of coal mechanically loaded by types of equipment used in each coalfield.

(*x*) Quantity of coal cleaned for

(*i*) the country as a whole, and

(*ii*) by Provinces and States separately.

Miscellaneous

(*y*) Exports by countries of destination for the year under report and preceding 9 years.

(*z*) Bunkers supplied annually at difierent Indian ports for the year under report and the preceding 9 years.

(*aa*) Imports by countries of origin for the year under report and preceding 9 years.

(*bb*) Growth of the industry from say 1901 or any later convenient year showing production, value, consumption, number of mines working, men employed, days worked, and net output per man per year and per shift.

(*cc*) World production by countries.

The above is by no means an exhaustive list ; for one thing we have not touched upon labour statistics save in a superficial way. They will undoubtedly be needed in considerable detail and useful examples are to be found in the figures compiled by the U. S. Bureau of Mines and the International Labour Office Publication " The World Coal Mining Industry (1938)".

Briquetting

13. In our chapter on Research we suggested that further investigations should be conducted to determine the suitability of Indian coals for briquetting. Here we shall briefly refer to what has been done so far in the matter and to certain other relevant considerations.

Briquetting on a small scale has been carried on in Assam, Punjab and Baluchistan and more recenty near Bagrakot in the Darjeelling hills ; but at some places the process adopted is a rather crude one. Some experiments on briquetting under pressure, and without binder, have also been tried on the Bikaner lignites. The principal centre of manufacture at present is, however, Baluchistan, where nearly 8,000 tons of briquettes were produced in 1945. The components used and their approximate proportions are as follows :

Coal	90%
Pitch	5%
Cereal	4½%
Lime	½%

With coal at Rs. 30 per ton and pitch and condemned atta at Rs. 180 and Rs. 80 per ton respectively, the cost of manufacture works out to about Rs. 48 per ton of briquettes. This is high but a more reasonable price should be

possible with the return of normal conditions. It is reported that the Baluchistan briquettes have proved satisfactory as domestic fuel and on a small scale in boilers for steam raising.

14. Briquetting is of value in putting a friable coal or slack on the market in an acceptable form. As the tertiary coals of Assam, the Punjab and Baluchistan fall to powder easily, briquetting is of great significance in these areas. It may also be of value in dealing with the lignites of Bikaner and Cuddalore; the latter have a moisture content of about 15% after drying in the atmosphere and briquetting may be essential.

Briquetting is not necessary for the Gondwana coals, save for the slack and dust left after the separation of lump steam coal. But the demand for slack coal, certainly, is now said to be as great as the demand for steam coal, and on the ground of cost alone briquetting would seem to be precluded from consideration in this case. Whether used for domestic or industrial purposes, briquetting would have to compete with steam coal and soft coke respectively, and both would be appreciably cheaper. It is the high cost of the binder that enhances the price of briquettes to an extraordinary degree. But when the market for slack coal diminishes and if the process for briquetting under pressure can be successfully applied to the Gondwana coals, there might be possibilities. In a way, the briquettes would constitute an excellent form of fuel for it is stated that the finer screen sizes of the majority of Indian coals are of better quality than the run-of-mine coal from the same sources. We are unable to offer an opinion on the suggestion made to us that, save for the lignites and tertiary coals, briquetting can be carried on successfully only as an adjunct to low temperature carbonisation. The economics of the matter require careful study by the Fuel Research Institute.

Conclusions And Recommendations.

(1) **It is necessary to take urgent steps for increasing the facilities for technical training in mining.**

(2) **The acquisition of surface rights for colliery purposes requires to be facilitated and certain amendments to the Land Acquisition Act must be undertaken.**

(3) **Coal statistics should be maintained on modern and more comprehensive lines than hitherto. There should be a special section dealing with statistics in the Department of Fuel and Power.**

(4) Immediately, briquetting possibilities are confined to the tertiary coals and lignites, but **investigations might be conducted on the briquetting of other coals in conjunction with low temperature carbonisation.**

CHAPTER XXX

ADMINISTRATIVE PROPOSALS.

The Constitutional Position.

The constitutional position under the Government of India Act. 1935, is that in relation to coal, the regulation of labour and safety in mines is a Central subject; the regulation of mines and mineral development can also be brought under Central control to the extent to which it is declared by Central legislation to be expedient in the public interest, but no such legislation has so far been enacted. In the absence of Central legislation to this effect, the regulation of mines and mineral development is the concern of Provinces, who also have complete powers over the production, supply and distribution of goods. Rights in or over land are again a matter for Provincial Control, and by virtue of this, the grant of mining leases and the administration of mineral rights are Provincial subjects.

During war-time, the powers of the Provinces in regard to the production, supply and distribution of coal were taken over by the Central Government as an emergency measure. The Colliery Control Order, which is attached as Appendix XXI, sets forth the powers which were deemed necessary for the efficient functioning of the coal industry; briefly, they were for the regulation of the production, distribution and price of coal. The powers of the Central Government in these matters would normally have lapsed after the 30th September 1946, but early this year Parliament enacted legislation continuing to the Central Government the power to control the coal industry for a further maximum period of 5 years. This was done because of the vital importance of coal to the country's economy, which would have been adversely affected in the absence of unified control and direction so long as the supply of coal was inadequate for meeting the demand. A fresh Ordinance No. XVIII of 1946 issued on the 25th September 1946, provides for the continuance, during a limited period, of powers to control the production, supply and distribution of, and trade and commerce, in various commodities, including coal.

The Need For Central Control.

2. The Central Government have for some time been actively considering the question of assuming powers over mines and mineral development, in respect of certain minerals of national importance, including coal. The need for Central control has really to be judged in the light of the requirements of a situation and the possibility of meeting these requirements otherwise than through such control. We have discussed in earlier chapters what the circumstances demand by way of Governmental control and direction of the coal industry. It will be useful to re-state briefly the measures we consider necessary:

(*i*) Coal rights in the Permanently Settled areas of Bengal and Bihar should be acquired or vested in the State.

(*ii*) A very large increase in the output of coal is necessary in the next few years and the increase must be directed in accordance with a co-ordinated plan of development which will take into account the country's requiremnets of different classes of coal, the areas in which coal is needed, and the availability of adequate rail transport facilities.

(*iii*) Planning of rail transport must be co-ordinated with the coal production programme.

(*iv*) Technical advice should be associated with the grant of mining leases, etc., and in supervising the working and development of a leasehold.

(*v*) Royalty rates should be placed on a uniform basis.

(*vi*) The problems of fragmentation and irregular boundaries should be dealt with after a survey of the existing situation.

(*vii*) Stowing for conservation on a large scale should be undertaken.

(*viii*) In regard to new development, extensive mechanisation is very necessary.

(*ix*) So long as the supply of coal is short of the demand, distribution must be controlled. Even thereafter, control over distribution may have to be continued in the interests of scientific utilisation. In a scheme of complete regulation, a Central Marketing Agency may be the only effective machinery for enforcement.

(*x*) The use and production of good coking coal must be restricted. To facilitate this, a study must also be undertaken immediately of existing collieries so as to determine which of them contain reserves of good coking coal and which of coal suitable for washing.

(*xi*) The price of coal must be controlled not merely while the shortage lasts but as a permanent measure.

(*xii*) Steps should be taken to increase the domestic consumption of coal.

(*xiii*) Research on various aspects of coal production and utilisation must be conducted.

(*xiv*) Wages and amenities of coalfields' labour must be so fixed as to secure a contented and settled mining force. Related to this is the need for a comprehensive scheme of technical training.

(*xv*) The safety of mining labour and the due observance of mining rules and regulations should be secured.

In addition there are items such as an estimate of India's coal resources which is a task for the Geological Survey of India, electrification of the railway track and installation of large power stations in the coalfields and control over the export of coal.

3. The acquisition of mineral rights in coal in Bengal and Bihar is essentially a Provincial matter, but we have stated earlier that there is need for uniformity of action and avoidance of duplication of machinery. We have, therefore, suggested that it would be most desirable to entrust the duty of acquisition to one single body, working to a set of basic principles agreed upon in advance. It is, of course, not necessary to make the acquisition and ownership of mineral rights a Central subject, but the body we propose later for discharging executive functions in regard to coal would seem to be the most suitable for dealing with the acquisition of mineral rights.

As regards the planned development of the country's coal resources, we do not see how this objective can be achieved if Provinces and States were to work in isolation. We have explained why an all-India view in this matter is essential, and unless the responsibility for deciding and directing

such development in its broader aspects rests with the Central Government, we fear that there will be much confusion. Rail transport, which is irretrievably tied up with the question of development of new and old fields, must, of course, be Centrally administered.

We have stated, as regards the grant of mining leases, that subject to conformity with an all-India plan of development, the actual details of leasing can continue to be looked after by the Provinces, who must, for this purpose, provide themselves with adequate technical assistance. Nevertheless, advice on intricate problems may be necessary at a higher level and we think that such advice should be provided free a Central organisation staff with experts, who will also be discharging other duties. This suggestion is in line with the present procedure, for example, in regard to geological survey.

Uniformity or standardisation of royalty rates can be secured only by agreement amongst the Provinces and States concerned and this can best be brought about if the responsibility for initiating action and consulting Provinces and States is placed on the Central Government. We are proposing later that the price of coal must be fixed by the Centre, and as royalty enters into the costs of raising, the Centre must obviously have certain responsibilities in the matter.

The rectification of fragmented properties and irregular boundaries is a highly technical matter not directly raising financial or administrative issues and in which uniformity of principles is essential. As we are proposing an expert technical organisation at the Centre, we suggest that the powers in this behalf should be entrusted to that body. This body will also undertake the preliminary survey we have recommended.

Our comments in regard to fragmentation apply in even greater degree to sand stowing and mechanisation. Both are highly technitcal in nature and in regard to stowing there is the futher consideration that conservation, which is the objective, should be looked at from an all-India point of view ; for conservation seeks, as far as possible, to relate known resources to anticipated consumer requirements.

This brings us to the question of distribution and price controls. The major coal reserves of the country are contained in two Provinces and there are deposits of potential importanance in another Province and in several States. It can be truly said that the development of the country on sound lines can only be secured if the use and distribution of coal are regulated by one authority. Provinces and States may not always appreciate fully the requirements of the country as a whole ; more over, the need for uniform principles in price determination and regulation of use seems indisputable. Having regard to the very large annual coal requirements of the railways which are so completely dependent on this fuel, the distribution and price of coal have such strategic importance for the country as to require Central control. Frther, any scheme of Central marketing by the State can be operated only if the price, use and distribution of coal are controlled by the Centre.

The country's deposits of good coking coal are confined practically to one Province, and there is overwhelming need for ordering its production and use in the interests of the country as a whole. Steel is a commodity of fundamental importance and the increase in indigenous production that is being aimed at must be based on the continued availability of good coking coal wherever units of production may be located.

Our proposals for an increase in the domestic consumption of coal envisage a greater use of soft coke through out the country and we are doubtful whether any policy or programme directed towards an expansion of production and markets can be securd otherwise than through unified action.

Central direction has the obvious advantage of avoiding duplication of research and enabling it to be conducted on a more elaborate and extensive scale. Research on the lines we have suggested holds interests for each of the coal producing Provinces and from its nature there can be no conflict of aims and interests.

As regards labour, the peculiar position in this country is that most coal producing Provinces and States depend to a considerable extent on traditional sources of recruitment lying outside their territories. The prime objective of an efficient and settled mining force will be difficult to achieve if there is diversity of practice as between Provinces and States, not merely in regard to the recruitment of labour for coal mining but also in respect of wages and conditions of work. In saying this, we are not ignoring the fact that the labour requirements of the coal industry must be fitted into a larger scheme of things, but we do not think this will create difficulties in working to a co-ordinated and agreed system of recruitment, wages and amenities. To the extent that new development is dependent on an adequate labour supply, and in view also of the close connection between prices and wages, a degree of discretion or authority over colliery labour should be vested in the Central Government.

Mining rules and regulations prescribed the methods of work which are necessary for securing the safety of the worker and of the workings. They seek to lay down fundamental principles of mining which are of general applicability. Advantage lies in entrusting the framing of mining rules and regulations and control over their administration to a Central body whose services will be available to all Provinces and States.

4. In expressing these views on the need for centralised control over certain matters, we are not suggesting that constant consultation with the Provinces and States, as indeed with others of the public who are interested in different activities, can be dispensed with. On the contrary, a complex system of controls and regulation can work well only with the co-operation of all the elements concerned. But this fact should not obscure the need for uniformity of policy and procedure in regard to certain matters ; the absence of such uniformity will undoubtedly be detrimental to the country as a whole and also to the coal producing Provinces or States. Broadly speaking, our conclusion is that unified Central control is necessary over certain aspects of the development of production, over distribution and prices including wages, and over certain technical matters such as stowing, safety and research. The executive machinery created under the Centre for discharging these functions could conveniently act as the agent of the Provinces in regard to the acquisition of mineral rights and give advice to Provinces and States on the layout of an area for development, the grant of leases, the working of mines, the fixation of royalty rates, etc. In such matters, certain powers of initiative should vest in the Centre, though decisions would, as a matter of course, be taken in agreement with Provinces and States concerned.

The need for Central direction in certain matters seems obvious to us and we are hopeful that a solution of the constitutional difficulties, if any arise, in the formation of a centralised department will be found by mutual agreement between the various Provinces and States. We have a recent example

from Australia where the Commonwealth Government and the New South Wales Government have pooled their powers and a bill is now before the legislature recommending the setting up of a Joint Coal Board invested with very large powers over the coal insdustry in that country. There is a basic unity of thought behind most of our recommendations and the pattern will lose much of its significance under differing mineral policies of Provinces and States.

Administrative Rquirements.

5. It is now possible to consider the administrative machinery that will be needed for discharging the functions which we have proposed for the Centre. A brief reference may, however, be made first to the existing administrative position. The British Indian Provinces have hitherto concerned themselves mainly with the grant of mining leases, and no attempt has been made to regulate the development of coal resources or the use and distribution of coal. The grant of mining leases is left to the normal Revenue Administration and little technical advice is available or taken. The Central Government in the exercise of its powers had, however, set up a number of organisations. The Inspectorate of Mines has been in existance for many years, entrusted with securing compliance with the provisions of the Indian Mines Act and the rules and regulations made thereunder. A coal Grading Board looks after the regulation of the coal shipment trade on certain lines. A Soft Coke Cess Committee is charged with the duty of fostering the interests of the soft coke industry in the Provinces of Bengal, Bihar and Orissa. A Stowing Board deals with stowing operations, both compulsory and voluntary. Latterly, with the assumption by the Central Government of emergency powers during the war, the office of the Coal Commissioner has been created to deal with the control of production and distribution of coal. A Labour Welfare Organisation has also been created for administering the Coal Mines Welfare Fund created out of a cess imposed during the recent war. Organisations concerned with the supply of mining labour were also created as a war-time measure. A degree of co-ordination between regulated use and rail transport has been secured. But at the highest level, problems relating to the coal industry are still being dealt with by a number of Departments of the Central Government. Transport is completely controlled by the Railway Board and by the War Transport Department. Labour problems are the concern of the Labour Department. Since June 1944, the Department of Supply (now the Department of Industries and Supplies) has been responsible for the control of production, use and prices of coal. It is not practicable, in our opinion, to change the present departmental responsibilities in regard to transport and labour, though we certainly think that greater co-ordination and integration of activities should be aimed at. As coal is primarily a source of power, there is need for correlating development and other policies relating to it with policies in regard to power development. Fuel and power present aspects which, in our opinion, can and ought to be dealt with separately from the development of other minerals. We accordingly recommend the creation of a Department of Fuel and Power under a Minister with Cabinet rank.

As regards the executive machinery which should be created for discharging the various functions of the State, we shall make proposals presently. Here we shall state only the general principle that the present several agencies dealing with the different aspects of the coal industry must be brought under

unified control at a level other than a Central Government Department. From this we exclude the activities of the labour welfare organisation and of the Chief Inspector of Mines in regard to safety. The Coal Grading Board in its present form, will become antiquated when grading for internal consumption is introduced. The Stowing Board will need to extened its activities not merely in Bengal and Bihar but in other fields also. Stowing and grading and exports and soft coke manufacture, all impinge on much larger matters of policy and are in a sense inter-related.

6. If our proposal for the setting up of a separate Department of Fund Fuel and Power, with full Cabinet ranking, is accepted, we consider that, so far as the coal industry is concerned, the subjects that must engage the attention of the Department would be as follows :—

(1) Mineral Policy,
(2) Preparation and Collection of Statistics,
(3) Safety Measures.
(4) Research,
(5) Labour Welfare,
(6) Mining Leases and Royalties,
(7) Classifications of Coals,
(8) Conservation Schemes,
(9) Development and Utilisation,
(10) Administration of Cesses,
(11) Administrative Control over—
  (*a*) Production,
  (*b*) Prices,
  (*c*) Exports, and
  (*d*) Distribution, and
(12) Administration of Government-owned Collieries.

These functions are capable of two easy divisions : items (*1*) to (*5*) relate to matters of policy and routine management which should be looked after by the Department of Fuel and Power itself as indicated below, and items (6) to (12) require executive action of a more detailed character under the general control and supervision of the Department.

7. We offer first certain observations in regard to the matters which the Department will deal with at the Centre :

(*a*) Mineral Policy—It is essential that Government shou.d, in consultation with industry and with the approval of the legislature, clearly define the mineral policy of the country. We welcome the decision of Government to increase the staff of the Geological Survey of India fourfold to undertake a proper survey and exploration of the country's mineral resources including coal to which a pre-eminent place must undoubtedly be given. But mineral policy embraces many other factors and in regard to coal we hope that our report has furnished enough material for formulating policy on important matters needing urgent decisions. The coal industry will expect an early declaration of policy and industrial consumers will wish to know that the policy is designed to help the various plans for development. There is need, too, for providing a conscious direction of effort as an indication of continuing Government interest in the well-being of the coal industry as a whole.

(*b*) Staistics—We have dealt with this subject in another chapter.

(*c*) Safety Measure.—We consider that the present Inspectorate of Mines, which is concerned with enforcement of the Rule and Regulations

under the Indian Mines Act, should be responsible, so far as may be necessary, to the Department of Fuel and Power in relation to coal mining.

(*d*) Research—In another chapter we have indicated the importance of research on coal and have suggested a greatly expanded programme for the proposed Fuel Research Institute, particularly as regards the physical and chemical survey of Indian coals under a five year plan. We know that the proposed Fuel Research Institute is being organised under the auspices of the Council of Scientific and Industrial Research, but we do not consider excessive centralisation in the field of State acitivity in research is desirable and are of opinion that research in fuel matters should predominantly be the concern of the Department or Ministry of Fuel and Power. We do not object to co-ordination at the top in order to prevent duplication and confusion. But we are convinced that more useful and expeditious results will be forthcoming if fuel research is directly controlled by the Department of Fuel and Power and the help and co-operation of the industry are enlisted in the spheres of administration and a plan of work for the research stations.

(*e*) Labour Welfare.—A positive step was taken during war- time by Government in the matter of welfare for mine workers and the proceeds of a special cess of 4 annas per ton of coal have been earmarked for the programme of labour welfare. This fund is being administered under the control of the Labour Department, Government of India. It is a moot point whether the proceeds of a cess specifically levied on the coal industry for the welfare of the coal-mining labour should not be administered by the department directly responsible for the coal industry, *viz.*, the Department of Fuel and Power. We are impressed, however, by the need for uniformity in the matter of labour legislation and labour welfare over the entire field of industrial workers and consider therefore that there is merit in co-ordinating activities relating to labour welfare in the various industries and, especially, in the industries located in the same region. Accordingly, we are of the opinion that the Labour Department should continue to exercise both administrative and executive control over labour welfare policy and activity. But as regards colliery labour, the Department of Fuel and Power has a special interest and responsibility and it is essential that in the administration of the Labour Welfare Fund, representatives of that Department should be actively associated with the Labour Department at all stages of policy making and execution.

8. It is necessary to consider now whether a purely Governmental organisation is the ideal instrument for discharging the detailed executive functions enumerated at (6) to (12) in paragraph 6 above, and, if not, whether some other organisation can be devised for the purpose without in any way diminishing Governmental control or responsibility. Governmental activity in the field of business enterprise is nothing new to this country. But we think that when Government does enter the field of activity hitherto associated with private enterprise, it is only prudent that it should closely adapt its administrative procedure and technique to those which private business has found to be most successful. In framing our proposals we have considered the principal example of Government managed business activity in this country, *viz.*, the Railways.

It will be recalled that the Acworth Committee of 1920-21 recommended a complete separation of the Railway Budget from general revenues and its reconstruction in a form which would, firstly, free a great commercial enterprise from the trammels of the Governmental system which assumes that the concern goes out of business on the 31st of March each year and recommences *de novo* on the 1st of April and, secondly, emancipate railway management from the control of the Finance Department. The Committee considered that railway management was a highly technical business and that it had little in common with the raising of taxation, on the one hand, and with the control of the expenditure of an ordinary public Department, on the other. The essence of the proposal was that the Railway Department, once it has met its liability to its creditors, should itself regulate the disposal of its surpluses and should be free to retain them as reserves, to devote them for new capital puposes, or to effect a reduction of rates or an improvement of services. The Committee also thought that the ordinary civil service regulations and practices were not suitable for application to so specialised a concern as a railway. The Committee did not suggest that the railway organisation should be independent of Government control, but they considered that there was no reason why the control should take the form which is found suitable in respect of other Departments of the Government.

The proposals for a separation of the Railway Budget from the General Budget of the country were implemented in 1924 in terms of a convention accepted by the Legislative Assembly. It would appear from this Convention that the Legislature, for reasons into which we need not go, made a departure from the Acworth Committee's recommendations in certain respects. The Convention contemplates payment of a fixed contribution by the railways to the general revenues and a portion of any surplus after meeting certain charges. The Convention underwent a material alteration in 1943 due to the exigencies of the war and the division of surpluses was left for determination from year to year "on a consideration of the needs of the railways and general revenues ". We understand that the Convention is due for comprehensive revision and we do not, therefore, wish to express any opinion on the merits of the present system of railway finance and administration. The proposals we make later represent a substantial departure from this or any other Governmental system in force in this country. But in drawing up our scheme we have been influenced by comparatively recent developments in other countries.

In America, in the sphere of public administration, there are the well known examples of the Boulder, Bonneville and Tennessee Valley Authority. In the U. K., the British Broadcasting Corporation and the Electricity Board were set up in 1926, and the London Passenger Transport Board was created in 1933 to control all transportation services in Greater London. Again the Coal Commission created under the Coal Act, 1938, was empowered to assume, on behalf of the State, control over coal mines through the purchase of mining rights. These public agencies all adopted the corporate form for convenience of action and for effective functioning; managerial autonomy and flexibility of procedure were considered essential desiderata for success in management. In the words of a British writer, commenting on the reasons underlying the choice of the public corporate form, " we are seeking a combination of public ownership, public accountability and business management for public ends."* The late President Roosevelt commended the T.V.A.

* Socialisation and Transport by Morrison.

as "a corporation clothed with the power of Government, but possessed of the flexibility and initiative of a private enterprise." There is also the significant statement of the House Managers appended to the Conference Committee Report on the T.V.A. Bill: "we have sought to set up a legislative framework but not to encase it in a legislative strait jacket. We intend that the corporation shall have much of the essential freedom and elasticity of a private business corporation."

9. The managerial autonomy essential for business success demands freedom from political considerations and control. This does not imply that the Government or the Legislature should exercise no control over fundamental policies. A determination as to whether a particular coalfield shall be developed and necessary railway facilities arranged involves questions of broad policy and hence of economic planning for the Government and the Legislature to decide. But once such a decision has been taken, the opening up of the field etc. is a task to which political considerations ought to be completely unrelated.

Further, the appointment, tenure and conduct of Directors and/or Managers on a non-political basis is essential, as their duties embrace problems purely of a business or technical nature in regard to which considerations of merit alone should prevail.

10. A corporate form also means freedom from civil service rules and regulations. There is no obligation to conform to departmental procedure which, more often than not, is quite inapplicable to business practices and is deadening to business initiative. Acceptance of rigid civil service rules as to classification and seniority would deprive the corporation of one of the greatest attractions which it can offer to capable and ambitious employees. This was commented upon in the proceedings of the Royal Commission on Coal (1925) as follows:

> "A Government Department tends to work by rules and regulations which, however sincere may be the desire to keep them elastic, gradually become more rigid.....there cannot be (under a Government Department) the same resiliency in recognising and making provision for local conditions, predilections and methods of working.....The atmosphere which obtains in Government Departments.....is all against initiative and the taking of responsibility. Few civil servants are prermitted to take any responsibility before the age of 50 and when the age comes for him to take responsibility he is too old to have the courage to begin."

There is no doubt that rigid service rules lead to artificial standards of reletionship between management and employees and an escape from excessive uniformity is essential for the successful administration of personnel. It is well stated by a British writer[1]:

> "The Civil service tradition implies a rigid hierarchical organisation of authority.....The possiblity of Parliamentary interpellation upon any detail of administration crystalises rigidity and over-centralisation; an ex-Postmaster-General declares that as a result of this direct legislative contrel, 'the minutiæ of administration come right up to the highest officials, diverting their minds from broad matters of policy.' However well suited to routine administration, the ccmplete security of tenure characterising the civil service, with a tendency to promotion by seniority rather than merit, probably fails to offer an adequate spur to expression of originality, a first necessity in broadcasting, or to the salesmanship needed to create demand for a service."

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[1] The Public Corporation in Great Britain by Gordon. 1938

Large business corporations do, of course, tend to develop rigidity of regulations, but the main point is that there is a continuing pressure upon the officers of the corporation to seek new and improved methods of attaining results rather than be content with formalised routine.

11. In addition to the personnel factor, there are various other matters in which a corporation or a company is in a better position to apply business methods more readily than a Government department. The latter from its consitution must depend, for instance, upon annual budgets and appropriations, and it is conceivable that political factors will sometimes thrust themselves into the annual consideration of budgets. Continuity and development of a business enterprise require that it should be able to determine well in advance what funds will be available. This is not possible under a system of annual budgets.

12. Summing up, we feel that activity akin to business can be effectively carried on by the Government only through an agency which possesses a degree of autonomy and flexibility which is found in business enterprises. These characteristics can be secured by the device of a public corporation and cannot be obtained in a Government Department. If a public corporation is to function well, it should be seen that the very qualities which are responsible for its efficiency are not emasculated by rigid controls. The corporation can plan its programme and perform its work effectively only if its accounting is placed on a business basis. In such important fields as personnel, expenditure and purchasing, the best results can be achieved if complete freedom of action and control is given to the management.

13. There remains the question of accountability of such State-owned corporations to the taxpayer. The problem is one of formulating such controls as will ensure continuous and effective supervision of the work of the Government enterprise and, at the same, time leave to the corporation management freedom to conduct the business in an efficient and business like manner. We feel that such a supervision can be exercised by an effective participation by the Department of Fuel and Power in the management policies of the proposed corporation. In our recommendations which follow, we have kept this matter of public accountability in the forefront and we believe that the mechanisms proposed will serve a useful and efficient purpose in safeguarding the larger interests of the State. It is interesting to note the views in this connection of a distinguished British economist [1]:

> "The complex technological problems involved, the need for a spirit of boldness and enterprise, the desire to escape from the excessive caution and circumspection which day-to-day responsibility to Parliament necessitates, the recognition that the operation of public utilities and industrial undertakings requires a more flexible type of organisation than that provided by the ordinary Whitehall Department—these were the principal causes which led to the establishment of the independent public service board and helped it to gain in public favour."

14. The National Coal Board set up in the U. K. by the recent Coal Industry Nationalisation Act is specifically constituted as "a body corporate with perpetual succession and a common seal and power to hold land without licence in mortmain[2]"

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1 The Public ServiceBoard by Robson, 1937
2 Section 2 (I) of the Act

The Joint Coal Board proposed in Australia is also designed as "a body corporate with perpetual succession and a common seal and may acquire, hold and dispose of real and personal property and shall be capable of suing and being sued in its corporate name." These recent examples have significance for us in determining the form which State control should take in the matter of the coal industry in the light of our survey.

15. We proceed now to state our proposals for the executive machinery required to discharge the functions (6) to (12) mentioned in para. 6 above. It may be noted that in respect of most of these matters Government are venturing into fields essentially of business enterprise. We propose that a body be constituted under the name and style of the National Coal Commission, as a corporate entity, with perpetual succession, a common seal and with power to hold real and personal property and capable of suing and being sued in its corporate name. The powers and functions of the National Coal Commission should be broad and comprehensive, and adapting to India the language of the proposed Australian Coal Bill, these may be summarised in this manner :—

"(1) The powers and functions of the National Coal Commission are to include the taking of such action as in the opinion of the Commission, is necessary or desirable :—

(*a*) to ensure that coal is produced in the country in such quantities and with such regularity as will meet requirements throughout India and in trade with other countries;

(*b*) to ensure that the coal resources of the country are conserved, developed, worked and used to the best advantage in the public interest;

(*c*) to ensure that the coal produced in the country is distributed and used in such manner, quantities, classes and grades and at such prices as are calculated best to serve the public interest and secure the economical use of coal and the maintenance of essential services and industrial activities.

(2) In particular, without limiting the generality of the foregoing, the Commission is to have power to make provision for or with respect to—

(*a*) the working and getting of coal, including the introduction and operation of sound mining principles and practices and methods of stowing and haulage, and the regulation of output;

(*b*) the conservation of coal, the development of any coal mine, seam or field, and the opening, closing or abandonment of any coal mine;

(*c*) the introduction, modification, replacement and operation of machinery, plant and equipment for use in connection with the production and distribution of coal, and the manufacture, procurement, improvement and standardization of such machinery, plant and equipment;

(*d*) the classification and grading of coal and its preparation for the market;

(*e*) the effective and economical distribution of coal, including its purchase, sale, marketing, acquisition, disposal, supply, storage, reservation, pooling, transport, carriage, conveyance, delivery, handling, loading, discharge and reception;

(*f*) the efficient and economical use of coal, the development of uses or markets for coal, and the recovery of the by-products of coal;

(*g*) the regulation of prices for the sale, purchase or re-sale of coal, the values at which coal is recorded in the accounts of any business, and of profits in the coal industry;

(*h*) any matter incidental to all or any of the foregoing matters.

(3) The commission is to have authority to make such orders, take such measures, give such directions and do such things as are, in the opinion of the Commission, necessary for, or incidental to, the effective exercise of its powers and functions and, in particular, without limiting the generality of the foregoing—

(*a*) to provide, and to assist others to provide, or obtain, advice, technical services, equipment, and other facilities and aids to efficiency and economy;

(*b*) to arrange for research, inquiries, investigations, surveys, tests and inspections;

(*c*) to enter into and carry out contracts and transactions, to incur expenditure and make advances, and to acquire and dispose of any property or rights;

(*d*) to require the keeping and production of accounts, books and records and the compilation and furnishing of statistics, returns and other information in such form and relating to such matters as it may specify in the requirements;

(*e*) to acquire any coal, sell any coal acquired by or vested in it, impose conditions under which any other person or authority may acquire, purchase, sell or dispose of coal, and enter into arrangements and agreements with other persons and authorities as to the sale or disposition of coal;

(*f*) to operate any mine vested in it;

(*g*) to acquire, procure, erect, construct, requisition the use of and operate plant, machinery and equipment (including railways, rolling stock and sidings, not being the property of the State);

(*h*) to assist others to establish and operate, coal mines and other undertakings or enterprises; and

(*i*) to terminate, suspend, vary or modify any contract or agreement relating to or affecting the production, supply or distribution of coal, including sale, transportation by land or sea, loading, discharge, delivery, storage and use;

(4) The Commission is to have power at any time to rescind, terminate or vary any order, direction or requirement made or given by it."

16. We consider that the vesting of the powers outlined above in a National Coal Commission is necessary for effectively carrying out the proposals we have made. We suggest that the Commission be constituted as consisting of a Chairman and four other members, appointed for a period of five years and eligible for re-appointment. Under present circumstances in India, we suggest that the choice of the first Chairman of the Commission be limited to a person with commercial legal experience (*e.g.*, a High Court Judge), of not over 50 years of age. Provinces and interested Indian States may each suggest a name and from such a panel the Minister will make a selection, if necessary

with the hlep and advice of the Federal Court. The other members of the Commission shall be appointed by the Minister from amongst "persons appearing to him to be qualified as having had experience of, and having shown capacity in industrial, commercial or financial matters, applied science, administration or the organisation of workers [1]." It is essential to secure that all members of the Commission are persons who profess a belief in the feasibility and wisdom of State regulation of the coal industry. They shall not continue to have any financial or other interest in any company or firm engaged in the business of producing, distributing or selling coal and its bye-products.

Of course, the officials, agents and employees of the National Coal Commission shall be appointed on merit by the Chairman and members of the Commission without regard to the civil service rules and regulations of Government and the Commission shall retain complete power over appointments, terms of service, promotions and other matters pertaining to its employees with no relation or reference to the Government service rules.

17. In respect of the funds required for the administration of the National Coal Commission, we would like to suggest a method by which the Commission would have an assurance of a minimum of funds available every year. There is no suggestion that the control of the Minister or of the Legislature should to any extent be reduced or diminished, but we consider it desirable that the Government and the Legislature should sanction enough funds to cover, over a sufficiently long period, the implementing of long-term policies specifically approved. There is a suggestion that the proceeds of a cess on the industry should be made available to the National Coal Commission. Sanction for the imposition of the cess must, of course, come from the Legislature. But such sanctions need not be an annual affair. The purposes for which the coal production cess on despatches was levied a few years ago have been largely discharged, although the need for more production of coal continues. We have suggested elsewhere the abolition of this cess, but before this is done, the problem of financing the National Coal Commission by allocating to it the cess proceeds on a lower basis should be considered. We do not know whether, even if practicable, it is politic to impose a cess on the industry for the maintenance of a Government organisation set up for the purpose of assisting the particular industry. If such a procedure is considered impolitic or unwise, some other method must be found for assuring certain minimum funds to the National Coal Commission. It remain s to add that the accountability of the National Coal Commission through the Minister for Fuel and Power remains in every respect to the Legislature. We include here the presentation of the balance sheet and the budget of the National Coal Commission for the approval of the Legislature every year. But we think that this accountability should, nonetheless, empower the Coal Commission to frame its own balance sheet on the lines of a commercial organisation and entitle it to retain under its own control surpluses after making a fixed contribution to the general revenues, in the event of the Commission being placed in charge of operations yielding or likely to yield a profit.

18. We contemplate association with the Commission of various boards or committees at several stages. Precedence must be given to a Standing Committee on Coal, which we suggest should be set up by the Central Legislature on lines similar to the Standing Railway Finance Committee. If at all

[1] The U. K. Coal Industry Nationalisation Act.

possible, we would welcome a broader supervision than mere scrutiny over finance by this Committee of the Legislature in respect of coal matters. We have in mind regular sessions of the Committee, which should be empowered to call upon any official of the Government or of the National Coal Commission, or even representatives from the industry and the public, to tender evidence and provide information relevant to the coal industry. The doctrine of public accountability may thus be enlarged to embrace a large-scale investigation every year into the working of a State enterprise where public benefit remains the principal objective. We do not consider the innovation as contrary to any constitutional provisions, nor do we think it is opposed to our present knowledge of democratic procedure.

19. We shall now state briefly our ideas about certain advisory or consultative bodies which should, in our opinion, be associated with the work of the National Coal Commission.

First in order of importance, we suggest a Coal Consultative Board which will meet at least three times a year and review periodically the entire work of the National Coal Commission. This body should be a statutory body with well defined functions and charged with the duty of advising the National Coal Commission and whose recommendations the Commission will, as a matter of convention, be expected to follow, except in cases where the Chairman and Members of the Commission oppose, and the Minister for Fuel and Power agrees to override, the recommendations of the Consultative Body. This body should be composed in the following manner :—

Chairman of National Coal Commission (*ex-officio* President).
Two representatives of producers ; the Mining Associations to submit a panel of names for final selection by the Minister.
Two representatives of workers ; registered Trade Unions to suggest a panel of names for the Minister to select from.
Two representatives of consumers.
One nominee of the Government of India, Railway Board.
Two nominees of Indian States in which coal is produced.
One nominee respectively of the Bengal Bihar, and C.P. Governments.
Chief Inspector of Mines (*ex-officio*).

Next in importance should be a Development Committee, directly associated with the plans or programmes of development of new fields. It is essential that the Governments of the Provinces or of the States in whose jurisdiction the proposed development is to be carried out should be brought into consultation at as early a stage as possible. The composition of this Committee would, therefore, vary with the particular programme, but in all events we consider the following should be represented :

A member of the National Coal Commission to be nominated by the Chairman,
A nominee of the Railway Board,
A nominee of the Advisory Price Committee,
Chief Inspector of Mines or his nominee,
Director of Geological Survey of India or his nominee,
One representative each of the interested Provinces or States.

The Development Committee need not be a statutory body.

The third body we contemplate is an Advisory Price Committee. This Committee will have the duty of investigating the factors associated with prices and the considerations that should, at a particular time, determine the prices for various classes of coal. We have indicated in a previous chapter the

fundamental basis for fixing prices. The Price Committee will not, of course, be directly concerned in the determination of a social wage for labour, for this is a matter primarily for the Labour Department, Government of India. But the National Coal Commission, and through it the Price Committee, should be closely associated with the Labour Department's consideration of wage questions. The Price Committee should consist of the Chairman of the National Coal Commission and representatives of producers, consumers and workers. The findings of the Committee will be forwarded to the Department of Fuel and Power which will consult the appropriate Departments before final decision. We should like to suggest that prices should be announced well in advance, say 2 to 3 months, of the effective date and should not be altered frequently. We might also suggest that, in view of the immediate need for expanding production, consideration may be given to fixing the initial prices from 1947 for a fixed period of 2 or 3 years. We have recommended in an earlier chapter that prices should be reviewed before the end of the current year and as it is unlikely that the proposed Advisory Price Committee will start functioning by then, we suggest that the task be entrusted to the present Coal Control Board with a directive to conclude the review within the year, even if *ad hoc* methods alone are available. We are separately drawing Government's attention to this.

The fourth body we suggest is a Distribution Committee composed of representatives of the National Coal Commission, producers, consumers and the Railway Board ; it will review periodically the actual working of the system of controlled distribution, investigate complaints and establish procedure for attending to such complaints and tender advice for improvements in the system. We have suggested that such a Committee will act as a wholesome check on the operations of the authority entrusted with the day-to-day control over despatches. This Committee need not be a statutory body ; it should be located in Calcutta for obvious reasons.

The Soft Coke Cess Committee functioning under the Soft Coke Cess Act should continue with a modification in its personnel, representatives of consumers and the Director of the Fuel Research Institute being added as members. We have suggested elsewhere that research on domestic fuel should be undertaken by the Fuel Research Institute and the statutory obligations of the soft Coke Cess Committee in this matter may, therefore, be removed. Provision should, however, be made for bringing the work of this Committee directly under the Development and Utilisation section of the National Coal Commission.

There is next the Stowing Board, set up by the Coal Mines Safety (Stowing) Act of 1939 as the authority for administering the stowing cess and supervising stowing operations. We have recommended vastly increased stowing operations, and the importance of a compact Board, with authority to take quick decisions, has increased. We therefore suggest a recast of the composition of the present Stowing Board : it should be a small executive Board comprised of the technical experts of the industry and the Chief Inspector of Mines with a Chairman provided by the National Coal Commission.

The continuation of the Coal Grading Board set up under the Indian Coal Grading Board Act is perhaps necessary for the time being ; although we have proposed restrictions on exports, we have also advised the adoption of grading for the internal market. There is no point in disturbing the composition of this Board, as we feel that its duties and functions will gradually merge into the

new department on Classification of Coals as soon as our research into the physical and chemical properties of coal is well advanced. Until that time arrives, however, the present Grading Board is suitable and we have no alterations to suggest in its composition or its functions.

20. There are two other matters on which some comment is necessary.

In the matter of mining royalties, we have recommended acquisition of mineral rights by the State. If the proposal is accepted, under the existing constitutional position the provinces of Bengal and Bihar will be chiefly concerned. We have suggested that it would be advantageous if these provinces were to entrust to the Centre the detailed procedure relating to acquisition, etc. It is essential to have co-ordinated action in matters following acquisition, namely the recasting of leases in order to bring about standardisation of the terms and unification of royalties. All this work could be conveniently entrusted to the National Coal Commission which would have a branch dealing with questions relating to leases and possibly administering royalties, etc., one behalf of the Provinces concerned.

21. We have suggested that the National Coal Commission should be entrusted with the administration of Government owned collieries and in another chapter we have recommended the separation of the railway collieries from the administration of the railways. In our detailed plan for production we have provided a definite place for these railway collieries and we have envisaged their use not merely as insurance to the railways against short commercial supplies, but also for bridging the gap, if any, between production and demand, as a whole, throughout the country. During the next few years, when coal supplies are expected to fall short of requirements, these railway collieries should be worked to the maximum of their productive capacity and, if necessary, so as to improve on their present capacity production. Such a programme is capable of fulfilment only if the planners or the designers of the programme are also entrusted with the most important instrument which could help in executing the plan.

We have also considered the form of administration of these State properties and are of opinion that State enterprise, even though ostensibly conducted for public benefit, should pay as much attention, to efficiency and cost of operation as does a private enterprise. We recommend, therefore, that the railway collieries as a group should come under the management of the National Coal Commission and that the pattern of their administration should follow commercial practices. In detail, this may involve a recasting of the capital accounts of the railway collieries in order that annual balance sheets comparable to those of Joint Stock Companies can be prepared. It would also be necessary to provide working capital for the railway collieries. This should be the function of the National Coal Commission who in turn will make provisions for obtaining such funds on a more or less permanent basis from the Government. The accounts of the railway collieries, even when presented in commercial forms, will be incorporated in the General Budget of the National Coal Commission, but a recasting of the method of accounting and *de facto* separation of their accounts and finances will give to the railway collieries the flexibility which we consider very important from the point of view of efficient management.

It follows that if the management of these collieries is entrusted to a body other than the railways, the ownership of the collieries should also be transferred from the railways to that body to avoid any possibility of dual

control. We suggest that the simple way of doing this is to credit the railways with the capital at charge on account of the collieries at the time of transfer and debit the capital account of the National Coal Commission.

22. The fundamental fact which has emerged from our survey of coal problems is the need for planning as well as for public control in several respects. The solutions do not appear to be so simple as the industry left to itself can provide, nor is it just a question of introducing new mining technology or provisioning of finance or increasing the miners' wages. The scheme of our proposals and recommendations has been designed to provide such solutions from a practical angle. But the time factor is most important and we conclude this report with a plea for early decisions.

Conclusions And Recommendations.

(1) **Central control over various aspects of the coal industry is desirable and necessary in the interests of both the industry and the country. Such control should in certain matters be based upon the concurrence and co-operation of Provinces and States.**

(2) **We recommend the creation of a new Central Department of Fuel and Power.**

(3) Matters pertaining to the wages, welfare, etc. of colliery labour should continue to be dealt with by the Labour Department, **but there must be close consultation and co-operation between the two Departments in the framing and executing of policy.**

(4) We do not consider that a body organised on purely Governmental lines is suitable for discharging certain detailed executive duties which the State should assume in regard to the control of the coal industry.

(5) **The most suitable form for such an authority would be a statutory corporation, organised and run on business lines, but subject always to the control and supervision of the Department of Fuel and Power. We accordingly recommend the incorporation of a National Coal Commission.**

(6) **The Commission should be advised and assisted by a number of bodies including a Standing Committee of the Legislature, a Consultative Board, and Advisory Committees on development, prices and distribution.**

(7) **The various statutory bodies now functioning, viz., the Soft Coke Cess Committee, the Grading Board and the Stowing Board should be placed under the direct control of the Commission.**

(8) **The Commission should have an assured annual income and we suggest consideration of the possibility of levying a cess on coal for this purpose.**

(9) **The ownership and administration of the railway collieries should be transferred to the National Coal Commission.**

CHAPTER XXXI

CONCLUSIONS AND RECOMMENDATIONS

PART I

Chapter I

Chapter II

(1) The assumption by the Geological Survey of India that in estimating the reserves of good quality coal all seams at depths below 2,000 ft. may be ignored does not seem justified and **it is necessary to attempt an estimate of the reserves at depths below 2,000 ft. when more data are available.**

(2) The known reserves of good coking coal in the country may not exceed 700 to 750 million tons and, at the present rate of output, they will be exhausted in about 65 years. The country cannot, therefore, afford to be complacent over its reserves of good coking coal.

(3) There is no reason for anxiety over the resources of good quality non-coking coals, both high and low volatile, or of low grade coals.

(4) **A work of importance for the Fuel Research Institute is to attempt to devise a process for desulphurising the high sulphur, but otherwise excellent, coking coals of Assam.**

Chapter III

(1) The history of coal production in the last 25 years falls into five periods during two of which the industry has been assailed by severe depression. Periods of falling demand were also periods in which there was considerable over-production.

(2) There has lately been a continued growth in the number of larger collieries.

(3) The bulk of the coal is consumed by a few principal consumers, but the absence of statistics prevents a study of consumption by classes of coal.

Chapter IV.

(1) In war time, even with the control over distribution, considerable quantities of good coking coal went to the railways, bunkers, exports, and a number of consumers other than iron and steel works and coke ovens.

(2) Our estimate of coal requirements from 1956 is about 41 million tons per annum ; but there are certain factors which will vary the requirements.

(3) We do not favour the dependence of vital industries on imported oil and **advise against the conversion of the Ahmedabad cotton textile mills to oil. Adequate quantities of coal to meet all internal requirements can and must be made available.** Nevertheless, for mainly economic reasons, oil may have replaced nearly 1 million tons of coal in certain areas by 1956.

(4) **It is essential to increase the domestic consumption of soft coke and for this purpose, we suggest a target of 3 million tons of coal per annum from 1956.**

Chapter V.

(1) **There should be no quantitative restrictions on the supply of coal for bunker purposes** ; the requirements are small and the general case for meeting them in full very strong.

(2) The comments of the Coal Mining Committee, 1937, on sectional grading as arising out of the Coal Grading Board Act are not valid in the light of our recommendations on conservation.

(3) The emphasis placed on the coal export trade in the past has no longer any validity. **Exports may normally be permitted only to Burma, Ceylon and the Straits Settlements, subject to certain limits ; exports to other countries may be permitted only in special circumstances.**

(4) **The concessions that have so far attached to export coal should be withdrawn forthwith. The concessions on coastwise coal should continue.**

(5) **As far as possible, coal for internal requirements, other than those of the railways at certain places, should not be sent coastwise in the present circumstances of high sea freight rates. Such shipments should be confined to all coal for bunkers and coal for the railways in Madras, Bombay and Karachi so long as transport is short.**

Chapter VI

(1) There is urgent need for increasing the supply of electricity in the coalfield and we recommend that a **comprehensive survey of power requirements should be undertaken forthwith.**

(2) Electricity development should aim at the installation of large power units and **three generating plants of 50,000 K.W. capacity each should be immediately installed in the Bengal/Bihar fields. The question of adequate supply in the Central Provinces should also receive immediate attention.**

(3) There is need for an early clarification of Government's policy in regard to private power development ; **unless an adequate supply of electricity in the coal fields is arranged, under public control, private installations should be permitted to go forward in the interests of coal production.**

(4) We believe that hydro-electric development in the Damodar Valley will be of direct benefit to the coal industry.

(5) **Electrification of the railways should be undertaken in the vicinity of coal fields and the scheme for electrification of the East Indian Railway from Howrah to Moghalserai should receive first priority.**

(6) Large scale electrification may result in a reduction of coal consumption by nearly 2 1/4 million tons of good coal per annum.

Chapter VII

(1) As our reserves of good coking coal are limited, it is necessary to pursue vigorously a study of blending and washing possibilities.

(2) But even with full resort to blending and washing it is unlikely that the resources available for the use of essential consumers of good coking coal will last more than 120 years at the present rate of exploitation. **The use of good coking coal should, therefore, be restricted. It should be supplied only to iron and steel works and coke ovens : and its use by the railways and other industries and for bunkers and export should be prohibited.**

(3) Restrictions on use and production cannot, however, be imposed until the output of other coals has been raised sufficiently to replace good coking coal. We do not think that this will be possible till about 1954, but **meanwhile the use of good coking coal for bunkers and exports should be prohibited.** The position should be watched carefully so as to enforce restrictions on output as soon as possible.

(4) When restriction on the output of good coking coal is imposed, it should be by way of quotas.

(5) To facilitate the task of restricting output, **a study should be made quickly of the collieries producing good coking coal and coal which may prove suitable for washing.**

(6) The regulation of the use of coking coal could best be secured by a system of licensing.

(7) We do not think that there is any case for the conservation in use of good non-coking coals for the present, but the question must be examined again when the chemical and physical survey of our coal resources has been completed.

(8) The Coal Mines Safety (Stowing) Act has been of limited value in view of its restricted scope. It is now necessary to extend stowing for conservation also.

(9) **Conservation from the mining point of view should aim at maximum extraction in respect of all coals with an ash content of up to 30%. For this purpose, stowing should be made compulsory, with certain exceptions.** Since arrangements for stowing on the wide scale envisaged will taketime, stowing for conservation should be enforced in certain cases as soon as possible.

(10) **Stowing should be assisted to the extent of 75% of the total cost, subject to a maximum assistance of Rs. 2/ per ton of coal extracted.**

(11) **For meeting the expenditure a cess should be levied at the rate of Re 1/2/0 per ton of coal and Re. 1/10/0 per ton of hard coke. But for the next 5 years the cess should be at the rate of 8 annas per ton of coal and 12 annas per ton of hard coke.**

(12) **We recommend that soft coke should be exempted from the Stowing Cess.**

(13) **In the construction of dams on the Damodar, the importance of the continued availability of sand for stowing should be borne in mind.**

(14) We do not see any present need for Government acquiring sand rights **but the power to do so, in the event of difficulties arising, should be taken.**

(15) The importance of rotation of working, which was emphasised by the Coal Mining Committee, 1937, has diminished.

(16) Attention should be given to the extraction with stowing of coa locked up under railways and the cost of stowing operations should be borne by the railways to a certain extent.

Chapter VIII

(1) **A measure of control over the use of coal is essential,** but factors other than scientific utilisation should influence our policy.

(2) The essential pre-requisites to an orderly regulation of use are a chemical and physical analysis of coal seams and a study of the coal requirements of various classes of consumers. **On the former should be based a compulsory grading of all coal seams.**

(3) When all seams have been analysed and graded, the need for a pre-despatch inspection of coal would depend on the extent to which use is regulated.

(4) **The railways certainly require good non-coking coal for their mail and express services but can use Grade II coals for goods services. There is need for studying the possibility of designing future locomotive boilers to burn high ash coals.**

(5) **Even before all coal seams have been analysed and graded and the need for complete regulation determined, the consumption of cotton textile mills, electricity companies, cement works, brickkilns and for soft coke manufactures can and should be regulated on the basis of war-time experience.**

(6) Save in the present context of inadequate railway facilities and with some exceptions, we do not accept the view that long distance haulage of high ash coals should be avoided.

(7) **If certain consumers are compelled to use inferior coals, it would be necessary to consider whether they should receive any concessions as regards the price of coal or railway freight or both.**

Chapter IX

(1) Making allowance for all the factors influencing requirements, approximately 39 million tons of coal are likely to be needed from 1956.

(2) The present gap between supply and requirements is about 4 million tons.

(3) **We suggest that the aim should be to step up supplies at the rate of 1 1/2 million tons per annum.** In that case a balancing of supply and demand would probably be achieved by 1954.

(4) It does not appear that a restriction on the use of coking coal can be imposed for another 9 years unless production should outstrip demand earlier.

PART II

Chapter X

(1) **The increase in production that is necessary can only be secured through a well-considered plan in the preparation and implementation of which the State must play a positive role.**

(2) Various factors which have a bearing on production must be considered and existing defects removed.

Chapter XI

(1) The Managing Agency system in relation to coal has both advantages and certain defects. On the whole, Managing Agents have rendered useful service in the past. The existence or otherwise of abuses should be a matter for enquiry and legislation, if necessary.

(2) There is some justification for the existence of the small privately owned collieries but if any of them react adversely on the interests of the country as a whole, remedial action is necessary.

(3) Some of the defects of private ownership and operation of the industry can be removed if the State makes it clear what the national interests dictate in regard to mineral development. This has not been done in the past.

Chapter XII

(1) It is not necessary to extend the period of validity of a prospecting licence beyond the present maximum of three years.

(2) **Mining leases should be for a period of 60 years with the option of renewal for a further 30 years.**

(3) **Techincal advice should always be associated by Government with the grant of a licence or lease and the development of an area. Where possible an area proposed to be developed should be laid out in a pre-determined manner having regard to all relevant technical considerations.**

(4) There are certain serious defects in the mining leases granted in the Permanently Settled areas of Bengal and Bihar.

(5) We consider that there is no justificaton for the levy of salami which has been responsible for certain serious evils in the development of the Bengal and Bihar fields.

(6) **There should be a uniformity of royalty rates in the future :** as to whether existing rates should be revised should be considered after Government take a decision on our proposals in Chapter XIV.

(7) The absence of in-stroke and out-stroke rights in certain leases leads to difficulties, but in existing circumstances there is no simple solution of the problem.

(8) In all the above matters, we would like to see the Indian States co-operating to secure uniformity of policy and practice.

Chapter XIII

(1) The large number of small holdings have resulted from various causes, the principal amongst which is the practice of salami.

(2) The uneconomic nature of an undertaking should be judged from the broad angle of national interest. From that aspect small mines, with exceptions, tend to be uneconomic and harmful.

(3) **For the future fragmentation should be avoided by a control over leases and sub-leases.**

(4) **The evils of the past can be remedied only by Government insisting on amalgamation or an adjustment of boundaries. This should be preceded by a detailed field survey of existing conditions.**

Chapter XIV

(1) The private ownership of mineral rights in the Permanently Settled areas of Bengal and Bihar has been responsible for a number of harmful consequences which cannot be removed so long as the present position continues.

(2) **The only solution is State acquisition of mineral rights, and we recommend it.** This is postulated also by the possibility of nationalisation of the coal industry in the years to come.

(3) **The State should by legislation vest in itself rights to coal at depths below 2500 feet and in all areas in which coal has not so far been discovered. No compensation should be payable in such cases. .**

(4) **The compensation for areas in which coal exists but is unworked should be nominal.**

(5) **Compensation for areas in whi chcoal is being worked should not exceed 10 times the royalty income in 1945.**

(6) Royalty payments in 1945 probably did not exceed Rs. 65 lakhs and **we suggest that the total compensation payable for the acquisition of mineral rights should not exceed Rs. 6 1/2 crores.**

(7) **The procedure for acquisition might be similar to that adopted in the United Kingdom Coal Act, 1938.**

(8) **We think it would be convenient and desirable to entrust the task of acquisition to the Central organisation we propose later.**

Chapter XV

(1) The main characteristics of Indian coal-mining labour are that absenteeism is large and average output low.

(2) There is urgent need for providing the industry with a settled mining force ; and this can probably be secured by improving working and living conditions and providing a better wage and adequate amenities.

(3) **For increasing the output of labour, training facilities for miners should be provided.**

(4) A Government sponsored organisation with Labour Exchanges in the main recruiting and coalfields' areas may be of help in recruitment and prevention of drift.

(5) Potentialities of machine cutting in older mines are limited but we think that **new development should be directed with the object of bringing about maximum possible mechanisation.**

(6) **The raising contractor system should be abandoned as early as possible.**

Chapter XVI

(1) We see no inherent objection to consumers owning and operating their own collieries, but **they should not be allowed to acquire coal properties out of proportion to their requirements.**

(2) As the railways are the largest buyers as also the largest producers of coal in India, the power in their hands must inevitably place them in an invidious position. **The administration of railway collieries should therefore be separated from the railway administration. They should be maintained and operated as a group with an obligation to serve the needs of the railways. They should operate on commercial principles of accountancy.**

(3) **Until production increases to the extent desired, the large reserve capacity of the railway collieries should be utilised to fill the gap between supply and demand.**

Chapter XVII

(1) **Arrangements should be made for rendering financial assistance to deserving mines.**

(2) Facilities for discounting of coal bills and increased banking facilities for small operators need to be developed.

(3) **As regards long-term financing, we suggest that the Industrial Finance Corporation should serve the coal industry also.**

(4) **A fair wage to labour should form the starting point for price fixation.**

(5) **Price control is necessary and should continue for all consumers.**

(6) **For price fixation, we propose the appointment of a representative Advisory Price Committee.** Prices fixed should not be subject to frequent alterations.

(7) The difference in the present prices of superior and inferior coals seems small.

Chapter XVIII

(1) **The development of new fields should aim at an output of 2 million tons per annum by 1956 ; but a reasonable price and a steady market are essential pre-requisites to development.**

(2) **Certain additional rail transport facilities will have to be arranged to enable these fields to be developed.**

(3) Government may also have to help in importing machinery and providing technical advice.

(4) Labour is not likely to prove a difficulty in the development of new fields.

Chapter XIX

(1) We do not think that State ownership and operation of the entire coal industry is a practical issue for the next ten years.

(2) Nevertheless, State ownership and operation may have to be extended in certain eventualities.

Chapter XX

PART III

Chapter XXI

(1) The sale and purchase of coal in pre-war days was a free market and consumers bought generally on considerations of price and quality. Quality was to some extent determined by the Grading Board's classifications but was more usually judged by the known quality of seams or collieries. Price generally followed the railway's purchase price.

(2) Distribution was principally by direct contract with the large consumers, and agents and middlemen were also used.

(3) Before the war the railways were on the whole discharging the task of carrying the country's coal traffic with a fair measure of success, except during the period of peak traffic in the early months of the year.

(4) The war-time control over distribution and prices helped the country to pass through critical times. **There is general agreement which we endorse, about the need for continuing control until supply and demand are balanced.**

Chapter XXII

(1) Our suggestions in this Chapter should result in a net increase in output of approximately 11 million tons by 1956 over an approximate present output of 31 million tons.

(2) **The increase contemplated can be secured only if adequate rail transport facilities are provided. Our recommendations for increased transport facilities include—**

(a) **certain extensions of the proposed Giridih-Hazaribagh Road-Hazaribagh and Gaya-Ranchi sections,**

(b) **provision of better facilities in the Kajora/Jambad/Samla area of the Raniganj field,**

(c) **the construction of branch lines in the Pench Valley field,**

(d) **increased facilities in Rewa State,**

(e) **construction of a branch line from the Khandwa-Akola section to go through the undeveloped coalfields of Betul district and on to the Pench Valley field,**

(f) **construction of a metre-gauge line to connect the metre-gauge bridge contemplated across the Ganges in Bihar with the Jharia, Raniganj, Bokaro and Karanpura fields,**

(g) **construction of a new broad-gauge line from Manikpur through the Singrauli coalfield to meet the Burwadih-Chirimiri section at a suitable point,**

(h) **removal of the bottlenecks ringing the Bengal/Bihar fields, especially on the above Moghalserai section.**

(3) **A high-powered Committee should be appointed to go into the entire question of rail transport facilities not merely for coal traffic but for all traffic.**

(4) A change is necessary in the hitherto accepted ideas on railway development, *viz.*, that the railways constitute a "commercial enterprise" rather than that they should be a means to an end.

(5) A system of zonal distribution of coal should be carefully worked out. Western, Central and Southern India should generally be served by the Central India, Central Provinces and Hyderabad State coalfields.

(6) There is need for speeding up arrangements for the grant of sidings to collieries. Applications should be screened before being passed on to the Railway Board.

(7) The old rules about the under—and over—loading of wagons should be restored.

(8) Where practicable, all collieries producing over 5,000 tons of coal per month should be encouraged to have their own private weigh-bridges ; all collieries producing over 10,000 tons per month should be compelled to instal them. A rebate of one anna per ton of coal weighed should be given in all such cases.

(9) The speed of goods trains should be increased.

Chapter XXIII

(1) The present freight rates on coal with certain exceptions, seem reasonable. If any general revision of freights is undertaken in consequence of the increased cost of operation of the railways, the preferential treatment now accorded to coal should be maintained.

(2) The group system of rates should be extended to all important coalfields.

(3) We recommend differential freight rates on inferior coal but consider that their introduction should be postponed until the rail transport position in the country as a whole eases.

(4) There is no case for different freight rates on coal used as fuel and as a raw material for processing in industry.

(5) The separate telescopic rate on coal for distances up to 400 miles should be abolished.

(6) There is no case for a lower rate on coal carried in train loads to one consignee.

(7) Seasonal rates are impracticable.

(8) There are no complaints against the freight payment system, but a small premium worked out on an acturial basis should be levied on freight and the railways should then carry the risk on coal *en route*.

(9) If the introduction of the group system of rtaes or differential rates necessitates amendment of Section 42 of the Railways Act, this should be undertaken.

Chapter XXIV

(1) Distribution control must continue so long as shortages of coal and of rail transport continue.

(2) The war-time system of control has, on the whole, worked satisfactorily, but we suggest the appointment of a small Committee to review the work of the Controlling Officer and to examine grievances.

(3) For the efficient operation of distribution. control, the collection of certain statistics is essential. They will be valuable also in ensuring that production does not outstrip demand.

(4) When supply has overtaken demand, the complete control over distribution should be modified.

(5) Distribution control through a Central Marketing Agency is not justified at present.

(6) The Colliery Control Order, in its reference to middlemen, has certain defects which should be removed.

(7) Control over prices should be continued even after control over distribution is modified.

Chapter XXV

PART IV

Chapter XXVI

(1) We suggest a plan for fuel research in India, arranging the items in order of priority.

(2) First attention should be paid to a chemical and physical survey of Indian coals, and the survey should be completed within 5 years.

(3) The proposed Fuel Research Institute is not staffed adequately for completing this survey in reasonable time. Three sub-stations must be set up in the Raniganj, Bokaro-Ramgarh-Karanpura and Central Provinces fields and the Central station should be provided with additional staff.

(4) Government should reconsider its decision as regards the rest of the Institute.

(5) The cost of fuel research should be shared by Government and industry and we suggest, therefore, that a cess of 1/4 anna per ton of coal despatched should be levied.

Chapter XXVII

(1) There is urgent need for extending our bye-product recovery operations in high temperature carbonisation and for this purpose both the installed recovery plants and the three unused ones now lying with Government should be put to full use.

(2) Some of the bye-products of high temperature carbonisation are valuable raw materials for important chemical industries and we recommend that the excise duty on Benzol should be removed.

(3) No coke-oven batteries should be permitted to be installed in future without a full complement of bye-product recovery plant.

(4) Without an intensive study of the behaviour of Indian coals, it is impossible to say what the value of low temperature carbonisation is to the country. But as it is essential to develop a suitable form of domestic fuel, the matter should be energetically investigated. Improved methods for the manufacture of soft coke, possibly on a centralised basis, should also be evolved.

Chapter XXVIII

(1) It should be considered whether a unification of health, medical and water supply arrangements in the coal fields can be secured.

(2) The Coal Production Cess should be abolished by 31-3-1947 unless it is proposed to use the cess for the other purpose indicated by us. In the latter event the rate should be reduced.

(3) The Provincial cesses should be based on despatches where possible but still collected by the Provinces from producers.

(4) Each Province should examine the possibility of unifying all its cesses.

(5) A unification of Central cesses is not practicable.

(6) We cannot recommend that the period of validity of the special rate of depreciation allowed on plant etc. should be extended for the coal industry alone, but if any such concessions are granted generally they will considerably facilitate mechanisation and new development.

(7) Favourable consideration should be given to the request for an amortisation allowance on mineral rights.

Chapter XXIX

(1) It is necessary to take urgent steps for increasing the facilities for technical training in mining.

(2) The acquisition of surface rights for colliery purposes requires to be facilitated and certain amendments to the Land Acquisition Act must be undertaken.

(3) Coal statistics should be maintained on modern and more comprehensive lines than hitherto. There should be a special section dealing with statistics in the Department of Fuel and Power.

(4) Immediately, briquetting possibilities are confined to the tertiary coals and lignites, but investigations might be conducted on the briquetting of other coals in conjunction with low temperature carbonisation.

Chapter XXX

(1) Central control over various aspects of the coal industry is desirable and necessary in the interests of both the industry and the country. Such control should in certain matters be based upon the concurrence and co-operation of Provinces and States.

(2) We recommend the creation of a new Central Department of Fuel and Power.

(3) Matters pertaining to the wages, welfare, etc. of colliery labour should continue to be dealt with by the Labour Department, but there must be close consultation and co-operation between the two Departments in the framing and execution of policy.

(4) We do not consider that a body organised on purely Governmental lines is suitable for discharging certain detailed executive duties which the State should assume in regard to the control of the coal industry.

(5) The most suitable form for such an authority would be a statutory corporation, organised and run on business lines, but subject always to the control and supervision of the Department of Fuel and Power. We accordingly recommend the incorporation of a National Coal Commission.

(6) The Commission should be advised and assisted by a number of bodies including a Standing Committee of the Legislature, a Consultative Board, and Advisory Committees on development, prices and distribution.

(7) The various statutory bodies now functioning, viz., the Soft Coke Cess Committee, the Grading Board and the Stowing Board should be placed under the direct control of the Commission.

(8) The Commission should have an assured annual income and we suggest consideration of the possibility of levying a cess on coal for this purpose.

(9) The ownership and administration of the railway collieries should be transferred to the National Coal Commission.

(K. C. Mahindra)
Chairman.
(K. C. Neogy)
(C. A. Innes)
(Raj Kanwar)
(M. Ikramullah)

(P. R. Nayak),
Secretary.
27th September, 1946.

APPENDIX I

Principal Recommendations of Previous Committees and the Action Taken

Serial No.	Recommendations	Action taken
	Coalfields' Committee, 1920	
1	A Controlling Authority should be set up by Government with power to— (*a*) regulate the leasing and sub-division of coal bearing lands, (*b*) bring about an adjustment of irregular boundaries, (*c*) regulate the dimensions of pillars and galleries, (*d*) forbid the extension of an area under pillars in certain circumstances, (*e*) prohibit the extraction of pillars under certain circumstances, (*f*) decide when and how pillars should be got, (*g*) prescribe the dimensions and positions of barriers, (*h*) order the isolation of workings, (*i*) regulate rotation of working, and (*j*) control workings under land acquired for railways. The Authority should take the form of a Coal Conservation Department under which would be a Board sitting at Calcutta.	No action was taken on the main recommendation though certain of the powers proposed have been assumed.
2	Colliery plans showing the size and shape of pillars and each year's workings should be maintained.	Being done.
3	Local Governments should give every facility to colliery companies in acquiring land under the Land Acquisition Act for housing labour.	This is now possible under the Land Acquisition Act.
4	Local Governments should grant permission under section 28 of the Indian Electricity Act more freely for the supply of power to collieries by other collieries who have spare installed capacity.	Permission is being granted more freely, though the position changed, for other reasons, during the recent war.
5	The supply of wagons for coal traffic should be adequate and the question should be gone into carefully.	——
6	Sand-stowing should be made compulsory in certain cases and the full cost should be reimbursed. For rendering financial assistance, a fund should be created by levying a cess on all coal and coke carried by rail in or into British India. The sand resources of the Damodar, Barakar and Adjai rivers should be surveyed by a Special Officer. Government should acquire sand rights on behalf of the Controlling Authority. One or two railway officers should be placed on special duty to devise a complete scheme for the collection and distribution of sand.	No action was taken as regards sand-stowing until after the report of the Coal Mining Committee, 1937.
	Indian Coal Committee, 1925	
1	Regular shifts of work should be introduced in the mines.	These are now obligatory.
2	Much remains to be done for improving wagon supplies for coal traffic during the first half of the year. The stock of wagons should be increased or the existing stock utilised for better advantage or both methods should be adopted.	Wagons for coal have always been inadequate during the first half of the year.
3	A detailed examination of depot capacity should be made so that capacity where inadequate can be improved.	Depot capacity is adequate.

Serial No.	Recommendations	Action taken
4	The 10-hour system of supplying wagons to collieries should be extended.	This was not adopted on any appreciable scale. We have commented on the recommendation elsewhere.
5	So as to supply empty wagons to collieries at regular hours, the daily wagon allotment should be restricted to wagons on hand and in sight.	This was worked to but a change became necessary in war-time.
6	The installation of private weighbridges should be encouraged by a reduction of one anna in the coal-field terminal charge.	The reduction was granted, but withdrawn soon after.
7	On certified coal for export an additional rebate of 12½% (making a total of 37½%) should be granted on railway freight to Calcutta.	Accepted. A further rebate of 8 annas is being granted from 1936 on certified export coal.
8	Collieries should be permitted to put in alternative indents for wagons.	Accepted but changed during war-time.
9	Collieries sidings should be sanctioned and constructed with expedition.	Before the war, there were few complaints about this.
10	The construction of private sidings in certain circumstances should be permitted.	Accepted.
11	The Railways should take certain steps to overcome difficulties over the under and over-loading of wagons.	Action taken but the situation is still difficult for various reasons.
12	Open and covered wagons should be grouped separately before being sent out to the collieries for loading. Covered wagons should generally be used for upcountry traffic and open wagons for dock traffic.	The first principle has been accepted, but there have been difficulties in working to it in war-time. The supply of covered wagons to collieries with mechanical loading plant creates a serious problem.
13	Preferential wagon supplies should be restricted to loco coal, bunker coal for steamers under mail contracts with Government, coal for public utilities and to certified coal for export. The remaining wagons should be distributed to collieries on a proportionate basis.	This was being done but the position has changed since the recent war.
14	The question of the most suitable type of mechanical loading appliances for the Calcutta Port should be investigated.	Done and suitable arrangement made or being made.
15	There should be a reduction of 4 annas per ton on river dues for certified export coal.	Accepted.
16	A Coal Grading Board should be set up for the purpose of grading collieries which produce coal for export and certifying individual consignments for shipment. Coals should be graded into four classes.	Action taken.
Coal Mining Committee, 1937		
1	Government must take positive measures of State control over the industry and enforce more practically the responsibility imposed on owners of coal mines under Section 16 (1) of the Indian Mines Act.	A larger measure of State control was introduced.
2	In the Permanently Settled areas, Government should control the terms of new leases so far as technical matters are concerned.	No action taken.
3	There is urgent need to conserve our good coal as the reserves are limited.	No action taken.
4	Sectional working of seams should be prohibited .	No action taken.
5	Principles of first working should be drawn up and power should be taken to regulate de-pillaring, section working, and rotation of working.	First principles have been prescribed and de-pillaring is regulated. Section working and rotation of working are not regulated.

Serial No.	Recommendations	Action taken
6	Action should be taken to extract the coal under railways and the Grand Trunk Road. The railways should contribute towards the former by collecting the propose stowing cess free of charge.	No action taken; the second recommendation was not accepted.
7	Section 84 of the Bengal Tenancy Act should be amended to facilitate the acquisition of surface rights for colliery purposes.	No action taken.
8	There is nothing anomalous in the railways working their own collieries but the company-managed railways should, like the State managed purchase at least 2/3 of their coal from the market.	Is generally being worked to. All principal railways are now State-managed.
9	Compulsory stowing for safety and conservation should be introduced and assisted to the extent of the cost of delivering sand at pithead. For financing stowing operations, a cess should be levied on all coal and coke despatched by rail at the rate of 8 annas per ton on coal and soft coke and 12 annas per ton on hard coke.	Compulsory stowing for safety introduced with full reimbursement of cost; voluntary stowing for conservation being partially assisted. A cess of 2 annas per ton on coal and soft coke and 3 annas per ton on hard coke is being levied.
10	A Statutory Authority should be set up with the following functions: (*a*) administration of the Cess and all arrangements for excavating and transporting sand to the collieries; (*b*) control over all compulsory and assisted voluntary stowing; (*c*) control over the section working of seams or parts of seams; (*d*) control over de-pillaring; (*e*) control over rotation of working; (*f*) control over measures to extinguish or circumscribe existing fires in closed-down collieries which are dangerious to life or property; (*g*) control over new leases; (*h*) control over amalgamation of small properties adjustment of irregular boundaries, transfer of isolated coal-bearing areas which cannot be conveniently worked from the parent property and treatment of abandoned mines; and (*i*) direction of research.	A Stowing Board has been created to look after compulsory and voluntary stowing operations. The power to order stowing for safety has been give to the Chief Inspector of Mines. No action has been taken as regards amalgamation of holdings adjustment of irregular boundaries, etc.
11	A number of amendments should be made to permanent and Temporary Mining regulations.	Action generally taken.
12	If the principle of conserving good quality coal is definitely adopted, Government should be consistent by assisting conservation as regards the utilisation of coal by the railways.	No action taken.
13	A Coal Research Board should be set up under the Statutory Authority.	Only recently a Fuel Research Institute has been sanctioned and is to work under the control of the Council of Scientific & Industrial Research.
14	The question of assisting the recovery of Benzol by a rebate on the excise duty should be considered.	Not accepted.
15	The group system of rates should be introduced in the Raniganj field.	Not accepted.
16	The scheme for 2 Central Rescue Stations in the Jharia & Raniganj fields should be accepted.	Accepted; the stations are now working and a Mines Rescue Excise Duty of 2¼ pies per ton of coal despatched from the two fields is being levied.
17	The application of the Payment of Wages Act to the coal mines should be further considered.	No decision yet taken.
18	Educational facilities in the coal fields should be improved and the Statutory Authority might function as the Mining Education Board for the area.	*No action taken.*
19	The Central Provinces Government should arrange for the inspection of working methods in mines by officers of the Mines Department.	*Not accepted.*

APPENDIX II

Coal Deposits Of India

A. ndwana Coal Measures

Province	Name of Coalfield	Area of field, if known	No. and thickness of seams occurring	Total reserves in 1933 except where stated to the contrary (according to G.S.I. Memoirs)	Quality of coal, if known	Remarks
1	2	3	4	5	6	7
			I. Darjeeling And Eastern Himlayan Region			
Assam . .	Abor Hills .	...	Patches up to 4 or 5 feet in thickness.	...	...	In difficult and hostile country. Not of economic importance at present.
Do. . .	Miri Hills .	...	Thin seams 3 to 8 inches thick.	...	...	...
Do. . .	Daphla Hills .	...	Seams varying from 5 feet to 6 feet in thickness.	...	Coal is crushed and splintered.	...
Do. . .	Aka Hills .	...	Thickest seam noted is only 18 inches thick.	...	Broken up and crushed	Deposit at present inaccessible.
Do. . .	Bhutan foothills	...	...	...	Crushed . . .	Nearest railway station 20 miles away.
Bengal . .	Darjeeling District.	...	Several seams, the best of which is Tindharia, 11 feet thick.	20 million tons . .	Said to be of caking quality. Average ash content 13 to 26 per cent.	...
			II. Rajmahal Hills Coalfields			
Bihar . . .	Hura . .	...	One 9 foot seam .	The calculated estimate of reserves for these 5 fields in 1898 was 210 million tons. Production during 1898 to 1933 (excluding 1915 to 1918 for which separate figures not available) was 47,236 tons.	Shaly associated with carbonaceous shale.	...
Do. . .	Gilhurria (Jilbari).	...	Two seams ; upper one not less than 6 feet thick.		Upper seam consists of carbonaceous shale with fragments of carbonised wood.	
Do. . .	Chuparbhita .	...	One inferior seam and two poor seams 9 feet and 6 feet.		Poor quality.	
Do. . .	Pachwara .	...				
Do. . .	Bahmani .	...	Several seams . .		Non-caking coal with high moisture suitable for brick burning.	

III. Deogarh Coalfields

Bihar	Kundit Karaia	...	Two thin seams	...	...	Not of economic value for coal.
Do.	Sahajuri	...	Two seams 18 feet to 25 feet thick.	22 million tons	Inferior coal, high in ash	...
Do.	Jainti	...	Three workable seams in Banskupi.	...	Not uniform ; portions look like Giridih coal and are of fair to good quality.	...

IV. Hazaribagh Coalfields

Bihar	Giridih	7 sq. miles	Three seams ; upper one 4 feet to 10 feet thick and another 15 feet to 24 feet.	49 million tons in 1934	Excellent coking coal	Upper seam almost exhausted.
Do.	Chope	...	One seam 4 feet thick	...	Poor quality	Amount of coal small.
Do.	Itkhori	...	Three seams	1·5 million tons.	Middle seam of reasonable quality.	Coal probably suitable for brick burning.

V. Damodar Valley Coalfields

Bengal and Bihar.	Raniganj	422 sq. miles	(1) *Barakar measures*: A number of seams of varying thickness. (2) *Raniganj measures*: A number of seams of varying thickness.	Total reserves in 1931: At 1000 feet: 5677 millions. At 2000 feet:— 8680 millions.	Three classes : Coking coal of superior quality; Non-caking coal of superior quality; Coal of inferior quality.	...
Bihar	Jharia	175 sq. miles	(1) *Raniganj measures*: Six seams. (2) *Barakar Measures*: Nineteen seams of varying thickness.	Total reserves estimated in 1930: At 1000 feet.—3122 millions. At 2000 feet.—4207 millions.	Mostly Grades II_c and III except one which is Grade I. 8 seams of Grade I and above, 4 seams of Grade II and the others of Grade III.	...

1	2	3	4	5	6	7
Bihar	Chandrapura	400 acres.	Nine seams with average thickness of 30 feet.	15 million tons	Grade II.	...
Do.	Bokaro	400 sq. miles	Twentynine seams, the three most important varying in thickness from 40 feet to 123 feet.	1000 million tons (Half is good coking coal).	Valuable steam and coking coal.	...
Do.	Ramgarh	30 sq. miles	Three thick seams from 26 feet to 36 feet.	150 million tons	16 per cent. ash. Middle seam appears to be an attractive proposition.	
Do.	South Karanpura.	75 sq. miles	About 17 seams	750 million tons.	Moderately high in ash but useful steam coal and yields a fairly hard coke.	
Do.	North Karanpura.	475 sq. miles	Several seams similar to those in Karanpura have been proved.	8750 million tons	...	Not yet exploited.
			VI. Palamau			
Bihar	Auranga	100 sq. miles	Many seams some 40 feet thick.	20 million tons	Coal is patchy and breaks rapidly on handling. Analysis:— fixed carbon 26·43 Vol. matter 27·81 Ash 35·41 Moisture 10·35	Coal is of little use except as powdered fuel in cement making.
	Hutar	80 sq. miles	Many seams varying from 1 foot to 7 feet	32 million tons	I and II grade with relatively high moisture.	
Do.	Daltonganj	32 sq. miles	One seam	9 million tons (1891)	Moderate quality.	...

VII. Mahanadi Valley						
Orissa (Talcher State)	Talcher . .	200 sq. miles .	Two workable seams, 9 feet and 13 feet thick.	An area of 22 sq. miles contains 100 to 150 million tons according to Dr. Fox (1933).	Low in ash but with 10 per cent. moisture . .	The portion west of Talcher town only has been prospected.
Orissa (South of Rewa State).	Ib River or Rampur. (Sambalpur).	...	Several coal seams of various thicknesses.	140 million tons. .	Fair to good quality .	...
Orissa (In Hingir Zamindary of Gangpur State).	Hingir . .	40 sq. miles .	Several fairly thick seams.	...	High ash . . .	...
VIII. Central India (Son) Valley						
Central India (Rewa State).	Singrauli .	900 sq. miles .	Number of seams proved.	...	Non-caking with moisture of 12 to 15 per cent. and ash 12 to 20 per cent.	Coalfield inaccessible and cannot be worked until a railway line is constructed through the coalfield
Do. . .	Korar . .	9 sq. miles .	Four seams, of from 4 feet to 8 feet thickness at various depths.	32 million tons . .	5.04 per cent. moisture and 16.92 per cent. ash.	...
Do. . .	Umaria . .	6 sq. miles .	Six seams, 4 of which are workable.	48 million tons (according to recent survey by Dr. Fox).	High in ash and moisture.	...
Do. . .	Johilla . .	15 sq. miles .	Lower and upper seams	81 million tons (according to recent review by Dr. Fox).	Non-caking, 7 to 10 per cent. moisture and 16 to 21.5 per cent ash.	...
Do. . .	Sohagpur .	1200 sq. miles .	Number of coal seams of workable thickness.	4000 million tons for South Rewa according to recent review by Dr. Fox).	Promising quality. Analysis shows. Ash 10.97% Moisture 10.3%.	Will become valuable with improvement in rail communications.
IX. North Chhatisgarh Coalfields						
Central Provinces.	Tatapani-Ramkola.	800 sq. miles of which 100 sq. miles is coal bearing.	Five seams of from 3 feet to 17 feet in thickness.	...	Not promising. .	...

1	2	3	4	5	6	7
Central Provinces.	Jhilmili	...	Several seams up to 6 feet recognised.	...	Some of the seams contain good quality coal and some have caking characteristics.	Inaccessibility renders it of little importance at present.
Korea State	Sanhat	330 sq. miles	Number of seams, thickness between 3 to 10 feet.	...	Moderate to high ash content.	...
Do.	Jhagrakhand	22 sq. miles	Number of seams of attractive quality.	34 million tons (1932)	Some coal is of good quality.	...
Do.	Kurasia	48 sq. miles	6 feet to 18 feet seams in the east. 36 feet of coal in the west (Chirimiri).	20 to 30 million tons	Attractive quality in the east. West Good quality fairly low in ash though moisture content is fairly high.	... ...
Do.	Koreagarh	6 sq. miles	Coal seams, 3 to 5 feet	...	...	Not explored properly.
Surguja State	Bisrampur (Surguja).	400 sq. miles	Several seams up to 7 feet proved.	...	In certain cases, analysis is promising.	Area not yet properly prospected.
Do.	Bansar	10 sq. miles	...	...	...	Area not yet properly prospected.
Central Provinces.	Lakhanpur (Surguja).	135 sq. miles	Six seams	...	Two seams contain coal of low ash content.	...
Do.	Panchbhaini	4½ sq. miles	Two seams 3 feet thick	...	Good quality coal.	...
Do.	Damhamunda	4½ sq. miles	Several thin seams	...	...	Field not of economic importance.
Do.	Sendurgar	20 sq. miles	Four seams of from 4 feet to 10 feet thickness.	40 million tons	Lowest ash found is 6.4 per cent.	...
X. South Chhatisgarh Coalfields						
Cetral Provinces (Surguja)	Has do-Rampur	400 sq. miles	Number of seams of workable thickness.	...	Inferior coal	Further investigation necessary.

Central Provinces.	Korba	200 sq. miles	Korba seam 70 to 150 feet and three others.	200 million tons (50 million tons of good quality can be expected from the east and west of Hasdo river.)	Korba seam of inferior quality. One of the others (near Rajgamar) containing 10 per cent. ash.	...
Do.	Mand River	200 sq. miles	Several thick seams	...	...	...
Do.	Kankani	...	No coal seams observed	...	...	Requires investigation.
Raigarh States (Eastern States Agency).	Raigarh-Hingir	200 sq. miles	Several seams of workable thickness.	...	Inferior quality.	...
Do.	South Raigarh	...	One 14 feet seam	...	40 per cent. ash	Of no economic value.
			XI. Satpura Basin			
Central Provinces.	Mohpani	...	Four coal seams of from 5 feet to 25 feet thickness.	4 million tons	In some seams, ash 10 to 14 per cent. and moisture 4 to 6 per cent. Remaining seams of poor quality.	...
Do.	Shahpur (Betul)	...	Seams are thin, about 5 feet thick.	15 million tons in Patha Khera area.	Fair quality	Further exploration is necessary.
Do.	Kanhan Valley	...	Five seams varying from 5 feet to 15 feet thickness.	...	Moderate quality hard coal, low moisture and ash content 17 to 19 per cent.	Caking character of much of Kanhan Valley coal is well known but little has been done to make hard coke.
Do.	Pench Valley	...	Several seams of which four are workable.	...	Coal relatively high in ash (17 to 26%) and moisture (2 to 9%).	...
			XII. Wardha Valley Coalfields			
Do.	Bandar	12 sq. miles	Four coal seams	108 million tons.	...	Lack of Railway facilities for exploitation.
Do.	Warora	420 acres.	Six seams	9 million tons	Calorific value of coal is 5600 calories.	...

1	2	3	4	5	6	7
Central Provinces	Wun	...	Three seams	240 million tons.	Non-caking coal containing 15·4% ash.	...
Do.	Ghugus-Telwasa	...	One 59 feet seam	1500 million tons	Non-caking	...
Do.	Chanda	...	Two seams, 19 & 26 feet.	...	...	...
Do.	Ballarpur	...	Two seams, 17 & 14 feet.	2000 million tons	Non-caking (10% moisture and 15% ash).	...
Do.	Wamanpalli	...	10 feet seam	1500 million tons	...	...
			XIII. Godavari Valley			
Hyderabad State.	Sasti-Rajura	200 sq. miles	50 ft. of coal	...	Coal similar to that at Ballarpur (Calorific value 6175 calories).	...
Do.	Antargaon-Aksapur.	...	6 feet seam	...	20% ash	...
Do.	Tandur	24 sq. miles	Two workable seams	...	Coal similar to that at Ballarpur.	...
Do.	Chinur-Sandrapali.	100 sq. miles	...	...	...	Isolated location.
Do.	Karlapalle	156 acres.	Two seams	3¾ million tons	Half the quantity is of fairly good quality.	...
Do.	Bandala-Allapali.	...	...	...	...	Country is isolated. No immediate need for the area to be re-surveyed.
Do.	Area opposite Lingala.	800 sq. miles	...	4000 million tons	..	...
Do.	Singareni	19 sq. miles	Five seams	36 million tons	Much of the coal is of reasonably attractive quality. One seam is of excellent quality.	...
Do.	Kothagudium	...	...	...	...	...
Do.	Damarcharla	...	Three seams	...	One seam is promising	...

Do. . .	Bedadanuru-Ashwaraopet.	...	Four thin seams .	...	...	Area not properly explored.

XIV. Godavari Valley (Madras)

Madras . .	Tal-River near Lingala. Near daorpali Beddadanol.	...	...		...	Result so far disappointing.
Do. .	Cuddalore and Arcot Districts.	...	...	...	...	Lignite deposits on which further exploration is proceeding.

B. Tertiary Coal Measures

Assam . .	Makum . .	Length is 5 miles.	One seem varying in thickness from 15 to 80 ft.	...	Good quality lignite .	...
Do. . .	Jaipur . .	Coal measures in about 20 miles.	Six seams with a total thickness of 45 ft.	...	Ash 4% but sulphur content high.	...
Do. . .	Namphuk-Namchik.	2 to 3 sq. miles	Several coal seams, one of which is 26 ft. thick.	...	...	...
Do. . .	Nazira . .	...	Several thin and five workable seams having an aggregate thickness of 70 ft.	...	...	...
Do. . .	Mikir Hill .	...	A number of seams .	...	Inferior quality. .	...
Do. . .	Khasi and Jaintia Hills.	...	Several seams . .	...	Some seams have caking characteristics. Ash content varies from 5 to 20%; sulphur is high.	...
Do. . .	Garo Hills .	...	Nine seams varying from 2 ft. to 9 ft. thickness.	...	Fairly good quality .	...
Baluchistan	Khost .	...	Thin seams . .	...	Low ash, high sulphur	...
Punjab . .	Dandot . .	2 sq. miles .	...	5 million tons . .	Low ash, high sulphur	...
Do. . .	Isha Khel .	...	Most important seam is Makerwal seam, 4 to 7 ft. thick.	...	Do. . .	...

1	2	3	4	5	6	7
Kashmir .	Kalakot . .	...	Five seams of from 2 ft. to 17 ft. thickness.	9 million tons . .	Generally hard, semi-bituminous coal; some of it is low volatile.	...
Do. . .	Mekta . .	...	...	5 million tons . .	Low volatile . .	...
Do. . .	Mahogala .	...	2 main seams totalling 12 ft. of coal.	4 million tons . .	Low volatile, coal of excellent quality, soft and friable.	...
Do. . .	Chakar . .	...	2 seams each about 5 ft. in thickness.	9 million tons . .	Low volatile coal of excellent quality, soft and friable.	...
Do. . .	Areas west of Chenab river.	...	A seam of workable thickness occurs at several places.	...	...	...
Do. . .	Areas east of Chenab river.	...	One coal seam up to 20 ft. thickness.	...	...	...
Do. . .	Dhansal-Sawalkot.	...	Two seams . .	...	Crushed and graphitic; low volatile but high ash content.	Inaccessible.
Do. . .	Dandli area .	...	Two very thin seams.	...	Inferior coal . .	...
North West Frontier Province.	Hazara Dt. .	...	One irregular seam up to 17 ft. thick.	...	Greatly crushed and sheared; very poor quality.	Little promise of economic exploitation.
Rajputana .	Bikaner . .	...	Lignitic seam of Palana of up to 20 ft.	...	Resinous, woody lignite, brownish black in colour.	...

APPENDIX III

Estimated Reserves of Workable Coal

N.B.—1. The seams have been given as stated in the replies received.
2. In some cases, reserves have been reported for a number of seams together

Name/No. of Seam	As at present worked	If full seam is worked (excluding figures in Col. 2)	Virgin seams and areas proved and thought workable	Total tons
1	2	3	4	5
Bihar—(Manbhum)—Jharia Field				
1	107,631	...	2.743,253	2,850,884
2	5,481,529	...	3,391,544	8,873,073
3	1,692,968	1,415,694	10,588,120	13,696,782
4	3,571,388	1,799,028	11,556,241	16,926,657
5	5,284,500	368,000	11,736,800	17,389,300
6	963,946	459,523	35,082,318	36,505,787
5 and 6	480,000	...	...	480,000
6 and 7	2,156,000	...	...	2,156,000
7	22,876,941	6,009,373	54,787,984	83,674,298
7 Special	1,355,000	49,685	1,200,000	2,604,685
7-A	...	...	1,386,600	1,386,600
7 and 8 combined	9,202,960	6,886,000	18,750,238	34,839,198
8	25,397,554	2,426,844	15,858,895	43,683,293
8 Special	...	...	28,875	28,875
8-A	...	...	560,000	560,000
9	27,531,212	7,389,125	73,713,440	108,633,777
7, 8 and 9	...	...	22,662,380	22,662,380
7, 8, 9 and 9-A	...	...	4,500,000	4,500,000
5 to 9	1,418,876	2,056,342	...	3,475,218
9-A	1,260,100	...	3,848,211	5,108,311
9-B	...	...	1,287,804	1,287,804
9 Special	921,660	545,000	8,382,439	9,849,099
9 and 10	...	...	8,000,000	8,000,000
10	152,673,934	101,874,017	275,920,337	530,468,288
10-A	2,698,177	2,208,523	15,645,080	20,551,780
10-B	...	...	2,220,666	2,220,666
10 Special	1,141,180	2,400,000	...	3,541,180
9, 10, and 11	500,000	500,000	1,000,000	2,000,000
10 and 11	933,333	2,177,778	2,600,000	5,711,111
11	123,943,233	24,372,983	45,812,314	194,128,530
11 and 12	6,854,222	21,040,000	15,892,000	43,786,222
12	80,208,916	46,806,334	40,509,104	167,524,354
12-A	...	93,850	...	93,850
13	49,714,530	18,439,150	18,188,997	86,342,677
13-A	2,013,272	...	4,656,084	6,669,356
13 and 13-A	92,000	...	...	92,000
13-B	4,401,707	...	4,522,751	8,924,458
11, 12 and 13	4,593,000	...	...	4,593,000
14	227,367,078	17,785,002	62,665,212	307,817,292
13, 14 and 14-A	7,200,000	...	...	7,200,000
14-A	2,444,422	1,046,000	8,889,000	12,379,422
15	64,813,957	16,429,092	40,844,581	122,087,630
15 and 15-A	2,550,000	...	...	2,550,000
15 and 16	...	...	13,002,000	13,002,000
16	65,524,313	5,291,750	48,168,496	118,984,559
16-A	7,467,000	4,419,000	...	11,886,000
17	15,542,401	48,150,290	24,058,000	87,750,691
17-A	1,400,000	2,920,000	...	4,320,000
17-B	1,144,000	...	...	1,144,000
18	13,932,879	...	8,656,000	22,588,879
18-A	...	...	1,660,000	1,660,000
19	...	...	2,370,000	2,370,000
23	...	40,997,730	...	40,997,730
Bottom	986,126	...	1,850,000	2,836,126
Bottom or Huntodih	2,350,000	...	...	2,350,000
Gopinathpur	2,900,000	...	...	2,900,000
Jogaraj (Local)	475,000	...	...	475,000
Jorapukar	17,980,717	...	...	17,980,717

Name/No. of Seam	As at present worked	If full seam is worked (excluding figures in Col. 2)	Virgin seams and areas proved and thought workable	Total tons
1	2	3	4	5
Bihar-(Manbhum)- Jharia Field				
Middle or Bhatdee	4,025,000	...	...	4,025,000
Mohuda	2,800,000	6,576,000	...	9,376,000
Mohuda (Bottom)	2,500,000	...	12,000,000	14,500,000
Mohuda (Top)	1,200,000	...	6,000,000	7,200,000
Raniganj Series	450,000	...	2,770,000	3,220,000
Special	5,709,833	102,500	88,804	5,901,137
Thick	...	7,380,000	...	7,380,000
Thin	600,000	...	...	600,000
Top and Bottom	...	...	2,108,434	2,108,434
Top	2,205,308	1,277,000	...	3,482,308
4 ft.	1,220,000	...	176,640	1,396,640
5 ft.	...	...	287,500	287,500
4th Section	...	...	1,700,160	1,700,160
Seam without name/ or No.	706,064	447,255	...	1,153,319
Total	994,963,867	402,326,068	954,140,102	2,351,430,037
Bihar-(Manbhum)-Ranigani Field				
Shampur No. 1	2.175,000	...	480,000	2,655,000
,, No. 2	2.135,000	...	576,000	2,711,000
,, No. 3	3,372,000	2,750,000	1,980,000	8,102,000
,, No. 4	8,353,600	...	4,510,000	12,863,600
,, No. 5	21,572,000	2,708,800	6,450,000	30,730,800
,, No. 6	10,150,000	...	3,620,000	13,770,000
Shampur	255,000	300,000	26,065,000	26,620,000
Badjna	42,025,600	...	8,040,000	50,065,600
Bottom	716,000	...	339,185	1,055,185
Bharatchuck	8,000,000	...	...	8,000,000
Brindabanpur	3,330,822	...	3,490,909	6,821,731
Chanch	10,000,000	...	...	10,000,000
Chhatabar	72,000	18,000	180,000	270,000
Dishergarh	50,000	...	...	50,000
Egarcoor	2,500	...	300,000	302,500
Gorai	112,320	312,000	...	424,320
Gopinathpur	2,796,750	18,000	8,328,000	11,142,750
Hirakhun	31,578	47,367	373,650	452,595
Jograj (Local)	475,000	...	...	475,000
Kalimati	3,381,107	2,240,000	12,853,900	18,475,007
Laikdih	57,700,000	...	120,500,000	178,200,000
Mahatadih	286,000	...	1,598,712	1,884,712
Middle	442,875	34,800	...	477,675
Poniati	1,501,000	...	...	1,501,000
Sanctoria	2,062,500	...	...	2,062,500
Thin	...	...	329,293	329,293
Top	451,375	34,522	...	485,897
20 ft.	18,000,000	...	...	18,000,000
40 ft.	...	...	22,000,000	22,000,000
Seam without name /or No.	...	...	71,770,000	71,770,000
Total	199,450,027	8,463,489	293,784,649	501,698,165
Bihar-(Santhal Parganas)--Raniganj Field				
1	900,000	500,000	...	1,400,000
Korabad	116,000	492,000	4,980,000	5,588,000
Kasta	1,000,000	1,440,000	1,000,000	3,440,000
Total	2,016,000	2,432,000	5,980,000	10,428,000

Name/No. of Seam	As at present worked	If full seam is worked (excluding figures in Col. 2)	Virgin seams and areas proved and thought workable	Total tons
1	2	3	4	5
Bihar-(Hazaribagh)-Bokaro Field				
Argada	67,750,000	..	6,397,000	74,147,000
Bermo	87,000,000	10,000,000	..	97,000,000
Jarangdih	1,400,000	..	..	1,400,000
Kargali	318,000,000	6,000,000	15,000,000	339,000,000
Kuju	16,000,000	..	16,000,000	32,000,000
Kurse	900,000	..	..	900,000
12 ft.	3,200,000	..	..	3,200,000
5, 7 & 8 ft.	29,000,000	..	..	29,000,000
Seam without name/or No.	..	..	341,000,000	341,000,000
Total	523,250,000	16,000,000	378,397,000	917,647,000
Bihar-(Hazaribagh)-Giridih Field				
Bhadua	3,300,000	..	..	3,300,000
Giridih	..	..	700,000	700,000
Kurhurbaree	7,130,000	..	..	7,130,000
Upper	6,950,000	..	..	6,950,000
Total	17,380,000	..	700,000	18,080,000
Bihar-(Hazaribagh)-Karanpura Field				
Argada	26,560,000	..	15,333,000	41,893,000
Sirka	9,444,000	2,506,000	..	11,950,000
Seam without name/or No.	..	..	3,687,000,000	3,687,000,000
Total	36,004,000	2,506,000	3,702,333,000	3,740,843,000
Total (Hazaribagh)	576,634,000	18,506,000	4,081,430,000	4,676,570,000
Bihar-(Ranchi)-North Karanpura Field				
Gernjee, No. 1 & 2	..	..	168,000,000	168,000,000
M a 1	..	..	24,192,000	24,192,000
M a 3	..	..	33,600,000	33,600,000
M a 4	..	..	33,600,000	33,600,000
M a 5	..	..	6,720,000	6,720,000
M a 6	..	..	5,040,000	5,040,000
Pinderkom No.1	..	..	2,100,000,000	2,100,000,000
Santi 2	..	..	83,600,000	83,600,000
Siram 4	..	..	502,112,000	502,112,000
Total	..	..	2,956,864,000	2,956,864,000
Bihar-(Ranchi)-South Karanpura Field				
Chappar 'A'	..	..	67,200,000	67,200,000
„ 'B'	..	..	39,600,000	39,600,000
Hendag 'A'	..	..	32,600,000	32,600,000
„ B'	..	..	27,000,000	27,000,000
Total	..	..	166,400,000	166,400,000
Bihar-(Ranchi)-Karanpura-Dewarkhand Field				
Bisrampur	8,500,000	..	..	8,500,000
Bukbuka	14,000,000	..	..	14,000,000
Total	22,500,000	..	..	22,500,000

Name/No. of Seam	As at present worked	If full seam is worked (excluding figures in Col. 2)	Virgin seams and areas proved and thought workable	Total tons
1	2	3	4	5
Bihar-(Ranchi)-Karanpura Field				
Churi	18,600,000	..	..	18,600,000
Dakra	8,400,000	9,240,000	8,500,000	26,140,000
Karkata	5,600,000	4,200,000	7,000,000	16,800,000
Ray 'B'	11,600,000	..	..	11,600,000
Total	44,200,000	13,440,000	15,500,000	73,140,000
Total (Ranchi)	66,700,000	13,440,000	3,138,764,000	3,218,904,000
Bihar-(Palamau)-North Karanpura Field				
Bisrampur	..	..	176,400,000	176,400,000
Bukbuka	..	..	560,000,000	560,000,000
Churi 'B'	..	..	78,400,000	78,400,000
Dakra	..	..	134,400,000	134,400,000
Dhub	..	..	50,400,000	50,400,000
Damada	..	..	280,000,000	280,000,000
Karkata	..	..	89,600,000	89,600,000
Lapra	..	..	175,760,000	175,760,000
D-1	..	..	376,320,000	376,320,000
D-2	..	..	24,192,000	24,192,000
D-3	..	..	25,600,000	25,600,000
D-4	..	..	28,000,000	28,000,000
D-5	..	..	14,000,000	14,000,000
Ray 'B'	..	..	51,000,000	51,000,000
Safi Damuda	..	..	9,300,000	9,300,000
Tumaung	..	..	57,400,000	57,400,000
Total	..	..	2,130,772,000	2,130,772,000
Bihar-(Palamau)-Auranga Field				
An	..	..	2,000,000	2,000,000
Balu	..	..	7,000,000	7,000,000
Bari	..	..	40,000,000	40,000,000
Bonhardi	..	..	10,000,000	10,000,000
Bura	..	..	1,000,000	1,000,000
Cheru	..	..	2,000,000	2,000,000
Darea	..	..	4,000,000	4,000,000
Ghutam	..	..	3,000,000	3,000,000
Gurtur	..	..	12,000,000	12,000,000
Jareang	..	..	11,000,000	11,000,000
Kita	..	..	2,000,000	2,000,000
Kuiram Kalan	..	..	6,000,000	6,000,000
Lejang	..	..	5,000,000	5,000,000
Lundibar	..	..	5,000,000	5,000,000
Kuriam Khurd	..	..	5,000,000	5,000,000
Patratu	..	..	4,000,000	4,000,000
Rajbar	..	..	12,000,000	12,000,000
Serak	..	..	700,000	700,000
Sobano	..	..	50,000,000	50,000,000
Sikni	..	..	4,000,000	4,000,000
Seam without name/or No.	10,000,000	15,000,000	..	25,000,000
Total Auranga Field	10,000,000	15,000,000	185,700,000	210,700,000
Bihar-(Palamau)-Rajhara Field				
Badoa	1,000,000	..	..	1,000,000

Name/No. of Seam	As at present worked	If full seam is worked (excluding figures in Col. 2)	Virgin seams and areas proved and thought workable	Total tons
1	2	3	4	5
Bihar-(Palamau)-Hutar Field				
Hutar	..	..	40,000,000	40,000,000
Total Palamau	11,000,000	15,000,000	2,356,472,000	2,382,472,000
Bihar-(Santhal Parganas)-Jainty Field				
Saharjuri	4,780,000	..	..	4,780,000
Total Bihar	1,855,543,894	460,167,557	10,830,570,751	13,146,282,202
Bengal-(Bankura)-Raniganj Field				
Hamirpur	1,200,000	480,000	..	1,680,000
Bengal-(Burdwan)-Raniganj Field				
Begunia	340,000	..	4,024,000	4,364,000
Bogra	5,873,039	1,580,948	..	7,453,987
Benali (Top)	..	..	2,625,000	2,625,000
Bonbahal	..	..	22,070,000	22,070,000
Burulia	..	..	3,100,000	3,100,000
Bharatchak	1,046,000	2,798,800	280,000	4,124,800
Bara Dhemo	80,000	120,000	40,070,388	40,270,388
Bankola	14,097,000	..	..	14,097,000
Bansra	..	..	645,000	645,000
Bottom	4,000,000	2,300,000	77,000,000	83,300,000
Chinakuri	8,700,000	..	..	8,700,000
Chora	..	..	37,238,997	37,238,997
Chowkidanga	5,000,000	1,100,000	2,500,000	8,600,000
Damagoria	1,570,000	1,830,000	3,800,000	7,200,000
Dhadka (Lower)	..	..	660,000	660,000
Dishergarh	25,489,212	25,000	55,916,000	81,430,212
Dhusal	..	..	7,659,000	7,659,000
Dobrana	..	..	3,420,000	3,420,000
'A'	..	..	32,000	32,000
'B'	2,200	8,800	..	11,000
'C'	..	..	28,000	28,000
Egara	3,233,324	5,637,076	..	8,870,400
Farewel	..	..	2,000,000	2,000,000
Ghusick	2,500,000	..	41,463,000	43,963,000
Gopalpur	..	..	456,000	456,000
Gopinathpur	..	..	5,500,000	5,500,000
Hatnol	1,441,500	217,650	2,400,000	4,059,150
Jambad	21,073,640	29,374,562	58,992,000	109,440,202
Jambad Bowla	20,680,000	11,000,000	..	31,680,000
Jotejanki	..	..	9,100,000	9,100,000
Jambad Lower	..	..	1,900,000	1,900,000
Jamehari	3,707,100	463,500	2,250,000	6,420,600
Kajora	9,677,583	4,620,000	503,667,355	517,964,938
Kajora (Upper)	2,747,392	1,377,876	1,506,600	5,631,868
Korthi	11,831,888	2,430,000	22,500,000	36,761,888
Kusadanga	1,132,348	300,000	24,468,000	25,900,348
Kenda	4,338,000	8,628,000	31,037,500	44,003,500
Laikdih	4,200,000	4,300,000	18,591,000	27,091,000
Monoharbahal	..	..	2,300,000	2,300,000
Nandi (Talton)	1,200,000	..	9,522,500	10,722,500
Nandi Poniati	..	..	3,900,000	3,900,000
Niga	7,037,232	2,968,156	211,502,500	221,507,888
Poniati	73,385,706	325,000	16,000,000	89,710,706
Poniati/Koithee	14,593,062	..	3,300,000	17,893,062

Name/No. of Seam	As at present worked	If full seam is worked (excluding figures in Col. 2)	Virgin seams and areas proved and thought workable	Total tons
1	2	3	4	5
Bengal-(Burdwan)-Raniganj Field				
Purusottampur	80,000	195,200	2,465,267	2,740,467
Pariharpur	..	..	7,952,500	7,952,500
Raghunathbati	20,000	..	900,000	920,000
Rana	5,500,000	..	5,200,000	10,700,000
Ramnagore	38,560,000	66,164,000	6,500,000	111,224,000
Raniganj	..	..	1,400,000	1,400,000
Satgram	13,055,499	8,565,539	28,996,000	50,617,038
Satgram (Bottom)	5,625,000	..	..	5,625,000
Salanpur	..	..	415,000	415,000
Salanpur—				
'A'	28,894,444	..	520,550	29,414,994
'B'	221,997	215,800	2,825,000	3,262,797
'C'	..	150,000	..	150,000
'D'	..	56,000	..	56,000
Sonachora	250,000	500,000	..	750,000
Salanpur B. & C.	..	..	6,000,000	6,000,000
Supplementary	..	..	444,444	444,444
Sanctoria	945,291	..	6,569,000	7,514,291
Samla	30,094,444	9,285,584	..	39,380,028
Searsole	..	..	20,000,000	20,000,000
Sripore	..	..	9,738,000	9,738,000
Top	52,410,000	72,609,000	..	125,019,000
Thin	29,000	..	..	29,000
Toposi	14,499,300	8,573,800	22,961,000	46,034,100
Taltone	..	..	1,410,000	1,410,000
Virgin	..	..	3,000,000	3,000,000
3 ft.	..	..	1,575,000	1,575,000
3½ ft.	..	..	1,837,500	1,837,500
4 ft.	..	..	5,228,999	5,228,999
6 ft.	..	..	5,184,000	5,184,000
7 ft.	..	..	4,725,000	4,725,000
19 ft.	..	..	19,699,200	19,699,200
15 ft.	..	..	17,280,000	17,280,000
22 ft.	..	..	76,032,000	76,032,000
24 ft.	..	..	96,768,000	96,768,000
No. 2	..	..	3,800,000	3,800,000
Seam without name/or No.	240,000	96,000	70,616,000	70,952,000
Total (Burdwan)	439,401,201	247,816,291	1,663,467,300	2,350,684,792
Total (Bengal)	440,601,201	248,296,291	1,663,467,300	2,352,364,792
Central Provinces-(Asifabad)-Wardha Valley Field				
Bottom	50,300,000	..	..	50,300,000
Middle	20,300,000	..	..	20,300,000
Top	50,300,000	..	..	50,300,000
Total Asifabad	120,900,000	..	..	120,900,000
Central Provinces-(Chanda)-Wardha Valley Field				
Bottom	40,100,000	..	..	40,100,000
Chanda	2,038,226	5,000,000	7,000,000	14,038,226
Majri	365,914	261,362	..	627,276
Mayo	24,400,000	..	..	24,400,000
Middle	16,700,000	..	..	16,700,000
Top	39,900,000	..	..	39,900,000
Total (Chanda)	123,504,140	5,261,362	7,000,000	135,765,502

Name/No. of Seam	As at present worked	If full seam is worked (excluding figures in Col. 2)	Virgin seams and areas proved and thought workable	Total tons
1	2	3	4	5
Central Provinces-(Yeotmal)-Wardha Valley Field				
Rajur	21,500,000	..	12,200,000	33,700,000
Central Provinces-(Chhindwara)-Pench Valley Field				
A Section	1,000,000	..	1,800,000	2,800,000
B Section	100.000	..	1,200,000	1,300,000
Datla	1,487,000	2,769,000	11,029,000	15,285,000
Ghorawari-Damua	9,744,000	2,056,000	5,109,000	16,909,000
Gondwana (Lower)	150,000	..	..	150,000
Junnardeo	312,999	350,000	1,716,000	2,378,999
Lower Bottom	40,000	..	1,232,000	1,272,000
Pench	2,172,000	12,568,000	3,465,000	18,205,000
Rawanwara	1,867,400	1,305,700	1,869,800	5,042,900
Thin	..	..	4,614,550	4,614,550
Upper	67,500	..	2,364,000	2,431,500
No. 1	19,160,000	..	1,887,000	21,047,000
Total (Chhindwara)	36,100,899	19,048,700	36,286,350	91,435,949
Total (C.P)	302,005,039	24,310,062	55,486,350	381,801,451
Assam-Khasi and Jaintia Field				
Lower	1,000,000	..	5,000,000	6,000,000
Assam-(Lakhimpur)-Makum Field				
20 ft.	1,000,000	..	..	1,000,000
60 ft.	3,500,000	..	..	3,500,000
Total (Lakhimpur)	4,500,000	..	..	4,500,000
Assam-(Naga Hills)-Nazira Field				
Kangon	210,000	126,000	2,242,000	2,578,000
Wakting	..	..	500,000	500,000
Total (Naga Hills)	210,000	126,000	2,742,000	3,078,000
Assam-Sibsagar Field				
1	37,000	18,000	..	55,000
2	79,200	..	102,520	181,720
3	44,000	..	136,400	180,400
4	..	..	88,000	88,000
5	..	...	165,000	165,000
Total (Sibsagar)	160,200	18,000	491,920	670,120
Total Assam	5,870,200	144,000	8,233,920	14,248,120
Orissa-(Sambalpur)-Hirgir-Rampur Field				
Rampur	1,300,000	..	5,600,00	6,900,000

Name/No. of Seam	As at present worked	If full seam is worked. (excluding figures in Col. 2)	Virgin seams and areas proved and thought workable	Total tons
1	2	3	4	5
Punjab-(Jhelum)-Salt Range (Dandot) Field				
7, 8, 9	1,000	2,000	3,000	6,000
1½ ft.	63,000	..	1,000,000	1,063,000
2 ft.	50,000	..	..	50,000
2½ ft.	12,000	..	24,000	36,000
3 ft.	160,000	..	..	160,000
Salt Range	31,000	35,000	40,000	106,000
Seams without name/or No.	170,000	..	330,000	500,000
Total (Jhelum)	427,000	37,000	1,397,000	1,921,000
Baluchistan (Sibi)-Khost Field				
Bottom	1.044,000	..	..	1,044,000
Middle	1,392,000	..	..	1,392,000
Top	2,088,000	..	..	2,088,000
2 to 3 ft.	666,666	..	..	666,666
1½ to 2½ ft.	633,333	..	..	633,333
1½ to 3½ ft.	250,000	..	..	250,000
Total (Sibi)	6,073,999.	—	—	6,073,999
Hyderabad State				
King	98,000,000	..	..	98,000,000
Thick	15,000,000	..	..	15,000,000
Total	113,000,000	..	..	113,000,000
Korea State				
2	9,593,463	..	..	9,593,463
3	53,029,246	32,166,904	..	85,196,150
Total	62,622,709	32,166,904	..	94,789,613
Rewa State				
Burhar	16,998,000	20,240,000	30,000,000	67,238,000
Charcha	..	..	23,500,000	23,500,000
hagrakhand	46,848,000	..	13,500,000	60,348,000
Outcrop	1,594	..	4,000	5,594
Kothona	..	..	9,250,000	9,250,000
1	5,400,000	..	6,144,000	11,544,000
2	12,720,000	..	10,752,000	23,472,000
3	57,767,000	15,767,000	..	73,534,000
4	8,000,000	..	15,360,000	23,360,000
5	..	..	5,600,000	5,600,000
Total	147,734,594	36,007,000	114,110,000	297,851,594
Talcher State				
Bottom	2,611,133	1,431,139	3,391,240	7,433,512
Top	625,132	411,518	..	1,036,650
Upper	13,400,000	..	..	13,400,000
3 ft.	7,000,000	..	..	7,000,000
61 ft.	15,000,000	..	..	15,000,000
18 ft.	25,300,000	..	..	25,300,000
Total	63,936,265	1,842,657	3,391,240	69,170,162
Total States	387,283,568	70,016,561	117,501,240	574,811,369
Grand Total	2,999,174,901	802,971,471	12,682,256,561	16,484,402,933

APPENDIX IV

Abstract Of Estimated Reserves Of Workable Coal

Province	District	Coal Field	As at present worked Tons	If full seam is worked .(excluding figures in previous Col.) Tons	Virgin seams and areas proved and thought workable Tons	Total tons
1	2	3	4	5	6	7
Bihar	Manbhum	Jharia	994,963,867	402,326,068	954,140,102	2,351,430,037
Do.	Do.	Raniganj.	199,450,027	8,463,489	293,784,649	501,698,165
Do.	Santhal Parganas	Do.	2,016,000	2,432,000	5,980,000	10,428,000
Do.	Hazaribagh	Bokaro	523,250,000	16,000,000	378,397,000	917,647,000
Do.	Do.	Giridih	17,380,000	..	700,000	18,080,000
Do.	Do.	Karanpura	36,004,000	2,506,000	3,702,333,000	3,740,843,000
Do.	Ranchi	North Karanpura	..	..	2,956,864,000	2,956,864,000
Do.	Do.	South do.	..	..	166,400,000	166,400,000
Do.	Do.	Karanpura-Dewarkhand	22,500,000	..	..	22,500,000
Do.	Do.	Karanpura	44,200,000	13,440,000	15,500,000	73,140,000
Do.	Palamau	North Karanpura	..	..	2,130,772,000	2,130,772,000
Do.	Do.	Auranga	10,000,000	15,000,000	185,700,000	210,700,000
Do.	Do.	Rajhara	1,000,000	..	..	1,000,000
Do.	Do.	Hutar	..	..	40,000,000	40,000,000
Do.	Santhal Parganas	Jainty	4,780,000	..	..	4,780,000
Bihar Total	..	..	1,855,543,894	460,167,557	10,830,570,751	13,146,282,202
Bengal	Bankura	Raniganj.	1,200,000	480,000	..	1,680,000
Do.	Burdwan	Do.	439,401,201	247,816,291	1,663,467,300	2,350,684,792
Bengal Total			440,601,201	248,296,291	1,663,467,300	2,352,364,792
Centel Provinces	Asifabad	Wardha Valley	120,900,000	..	..	120,900,000
Do.	Chanda	Do.	123,504,140	5,261,362	7,000,000	135,765,502
Do.	Yeotmal	Do.	21,500,000	..	12,200,000	33,700,000
Do.	Chindwara	Pench Velley	36,100,899	19,048,700	36,286,350	91,435,949
Central Provinces Total			302,005 039	24,310,062	55,486,350	381,801,451

Province	Distrit	Coal Field	As at present worked Tons	If full seam is worked, (excluding figures in previous Col.) Tons	Virgin seams and areas proved and thought workable Tons	Total tons
1	2	3	4	5	6	7
Assam . .	Khasi and Jaintia .	...	1,000,000	...	5,000,000	6,000,000
Do. . . .	Lakhimpur . .	Makum	4,500,000	...	...	4,500,000
Do. . . .	Naga Hills . .	Nazira	210,000	126,000	2,742,000	3,078,000
Do. . . .	Sibsagar . . .	...	160,200	18,000	491,920	670,120
Assam Total . .			5,870,200	144,000	8,233,920	14,248,120
Orissa	Sambalpur . .	Hingir-Rampur . .	1,300,000	...	5,600,000	6,900,000
Punjab . .	Jhelum . . .	Salt Range . . .	487,000	37,000	1,397,000	1,921,000
Baluchistan . . .	Sibi	Khost	6,073,999	...	...	6,073,999
Hyderabad State . .	...	...	113,000,000	...	...	113,000,000
Korea do. . .	...	...	62,622,709	32,166,904	...	94,789,613
Powa do. . .	...	...	147,734,594	36,007,000	114,110,000	297,851,594
Talcher do. . .	...	...	63,936,265	1,842,657	3,391,240	69,170,162
States Total . .	...	...	387,293,568	70,016,561	117,501,240	574,811,369
Grand Total . .	...	...	2,999,174,901	802,971,471	12,682,256,561	16,484,402,933

APPENDIX V

Statement showing output of Coal in British Indian Provinces and Indian States 1920-45

Year	British Indian Provinces										Indian States								
	Assam	Bihar*	Orissa	Bengal	Punjab	Baluchistan	Central Provinces	NWFP	Sind	Total	Khasi (Assam)	Talcher (Orissa)	Korea (C.P.)	Raigarh (C.P.)	Kalat (Baluchistan)	Hydera-bad	Raj-putana (Bikaner)	Rewa (C.I.)	Kashmir	Total	Grand Total
(a) 1920	325,535	11,975,656		4,207,452	58,078	33,941	491,205	..	..	17,091,867	..	..	..	..	..	694,080	18,216	158,051	..	870,347	17,962,214
1921	312,022	12,990,481		4,259,642	67,242	42,155	712,914	..	..	18,384,456	443	..	..	..	12,472	688,721	24,521	192,034	..	918,191	19,302,647
1922	347,650	12,711,323		4,328,036	67,180	49,552	675,916	..	..	18,171,612	453	..	..	..	19,583	642,880	15,055	161,221	..	839,202	19,010,814
1923	325,949	13,207 434		4,621,573	63,501	31,626	548,074	..	..	18,798,162	290	4,816	..	..	10,936	653,429	7,119	175,950	..	857,450	19,655,612
1924	334,562	14,109,112		5,031,655	80,422	29,947	679,081	..	..	20,265,779	280	5,417	..	..	10,610	644,775	21,870	235,298	..	918,250	21,174,029
1925	317,997	13,931,244		4,913,852	74,662	22,707	708,554	..	..	19,969,016	845	7,265	..	..	12,090	667,877	28,153	219,106	..	935,336	20,904,352
1926	300,506	13,942,404		5,137,683	68,043	9,131	635,252	..	..	20,093,024	555	13,371	..	..	6,455	637,779	31,275	216,708	..	906,143	20,999,167
1927	322,517	14,494,550		5,554,990	62,704	8,945	666,753	..	..	21,110,464	825	23,316	..	..	5,499	707,213	17,358	217,661	..	971,872	22,082,336
1928	297,501	14,780,216	(a)	5,639,993	46,152	11,217	732,353	..	..	21,516,432	588	38,237	..	..	6,714	734,765	27,386	218,750	..	1,026,440	22,542,872
1929	321,545	15,085,639		5,965,104	43,136	10,934	882,331	..	..	22,308,730	970	47,505	..	..	5,238	815,875	35,275	205,132	..	1,109,995	23,418,734
1930	358,035	14,995,452		6,316,523	50,619	11,301	952,371	..	..	22,684,306	1,005	68,973	3,517	..	4,503	812,298	35,123	193,233	..	1,118,742	23,803,048
1931	274,278	13,390,482		5,810,184	54,840	13,472	973,040	..	..	20,516,296	743	142,312	31,351	..	3,982	757,575	38,148	226,928	..	1,200,139	21,716,435
1932	298,802	11,593,630		5,782,603	72,857	13,957	1,049,238	..	..	18,721,087	1,233	253,586	113,858	..	4,971	781,121	37,043	240,488	..	1,432,300	20,153,387
1933	192,036	10,941,445		5,691,189	94,099	9,141	1,234,523	..	..	18,162,433	2,118	316,539	†266,388	included in Korea.	2,321	753,402	33,194	252,768	..	1,626,730	19,789,163
1934	188,313	12,323,760		6,159,486	125,266	10,519	1,438,989	..	..	20,244,324	3,214	306,649	†403,512	,,	4,221	769,636	36,510	289,381	..	1,813,123	22,057,447
1935	218,830	12,438,958		6,682,752	144,423	4,946	1,526,690	..	..	21,015,699	1,907	309,282	†591,987	,,	4,612	729,414	34,425	329,359	..	2,000,996	23,016,695
1936	201,593	12,016,914	31,061	6,667,841	156,840	3,451	1,507,932	..	..	20,585,691	1,646	223,664	†532,768	,,	4,648	852,739	30,177	329,488	..	2,025,130	22,610,821
1937	243,650	13,836,717	47,127	6,527,820	166,632	10,624	1,504,159	..	..	22,336,729	4,913	391,787	†853,201	,,	6,855	1,076,241	32,360	334,291	..	2,699,657	25,036,386
1938	257,364	15,364,079	44,125	7,745,372	184,028	14,388	1,658,626	..	..	25,278,282	10,964	448,235	†1,015,458	,,	7,494	1,211,163	34,717	336,583	..	3,064,624	28,342,906
1939	284,541	14,787,661	58,687	7,591,495	194,080	16,213	1,742,831	..	..	24,675,516	12,627	440,137	†1,051,064	,,	8,166	1,214,568	39,204	327,479	351	3,093,596	27,769,112
1940	279,056	15,344,992	62,699	8,459,082	195,610	13,247	1,806,513	11	50	26,146,021	7,384	469,665	†1,135,354	,,	5,642	1,250,122	40,588	333,205	423	3,242,473	29,388,494
1941	256,256	15,822,388	88,263	7,934,803	178,063	17,807	1,790,330	..	752	26,092,073	1,467	512,375	†1,116,810	,,	9,805	1,391,378	42,837	336,997	..	3,371,669	29,463,742
1942	255,371	15,917,281	146,733	7,633,794	135,755	22,595	1,836,522	..	1,222	25,954,273	4,408	446,220	†1,286,951	,,	14,432	1,277,158	47,966	401,510	930	3,478,980	29,433,253
1943	235,411	13,373,123	129,014	6,688,856	106,406	52,749	1,657,019	..	2,911	22,447,494	..	414,653	†1,439,358	..	..	1,067,372	..	Included in Korea.	..	2,921,385	25,368,879
1944	293,808	14,360,677	102,722	6,789,876	175,067	81,293	1,677,786	..	6,245	23,487,571	..	360,418	†1,185,692	..	..	931,875	..	,,	..	2,477,985	25,965,556
1945	302,193	16,589,996	112,529	7,290,650	161,825	136,561	1,649,243	..	12,213	26,255,210	..	332,783	†1,351,745	..	..	1,092,810	..	,,	..	2,717,338	28,972,548

*Figures for years prior to 1936 include Orissa.
(a) Figures included in Bihar.
(b) Figures for 1920 collected from 'Indian Coal Statistics' for 1932. The figures for Assam and Baluchistan include Khasi and Jaintia Hills State in the former and Kalat State in the latter.
†Include figures for Raigarh.
‡Include figures for Rewa.
Note.—Figures from 1920 to 1942 collected from 'Indian Coal Statistics'. Figures from 1943 to 1945 were obtained from the Chief Mining Engineer, Railway Board.

APPENDIX VI

Statement showing Prices of Coal in Various Provinces 1920—43

Year	Provinces (British India)										Indian States									
	Assam	Bengal	Bihar	Orissa	Punjab	Baluchistan	Central Provinces	NWFP	Others	Average	Assam (Khasi State)	Orissa (Talcher (State)	CP (Korea State and Raigarh State)	Baluchistan (Kalat State)	Rajputana	Central India	Hyderabad	Kashmir	Average	Average (All India)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.
1920	7 8	6 5	4 9	4 9	12 4	16 10	5 13	...	...	5 2	...	...	...	...	7 7	4 5	6 0	...	5 12	5 3
1921	7 13	7 12	6 7		14 14	15 13	7 0	...	11 7	6 11	7 6	...	...	7 8	8 13	5 11	8 2	...	7 11	6 12
1922	8 5	9 10	6 15		14 14	16 5	7 11	...	16 0	7 11	6 6	...	...	7 8	7 2	5 13	8 1	...	7 10	7 11
1923	8 11	9 2	6 14		10 0	17 5	6 11	...	21 6	7 7	10 10	5 0	...	7 13	6 14	5 13	7 0	...	6 12	7 7
1924	8 13	8 1	6 12		8 11	17 11	6 1	...	30 0	7 2	14 0	5 0	...	10 12	7 1	5 13	6 8	...	6 6	7 1
1925	8 10	6 13	5 11		8 3	15 0	6 3	...	...	6 1	6 14	5 0	...	9 6	6 15	4 9	6 4	...	5 14	6 1
1926	7 14	5 4	4 9		7 5	9 4	5 4	...	...	4 13	6 9	6 2	...	9 12	6 4	4 9	4 12	...	4 13	4 13
1927	12 12	4 7	4 0		7 3	7 14	4 7	...	...	4 4	6 11	4 13	...	9 4	6 14	4 6	5 0	...	4 15	4 5
1928	12 12	4 0	3 10	(a)	6 12	9 1	4 3	...	...	3 14	6 8	4 14	...	9 4	6 12	3 14	4 11	...	4 10	3 15
1929	12 11	3 13	3 9		6 11	8 11	4 4	...	...	3 13	8 1	4 13	...	9 1	5 11	3 13	4 5	...	4 5	3 13
1930	10 13	3 15	3 11		6 1	7 12	4 4	...	...	3 14	7 15	5 2	3 14	7 11	4 9	4 1	3 13	...	4 0	3 14
1931	11 5	3 13	3 9		4 13	8 8	4 1	...	...	3 13	7 15	4 15	4 1	6 5	3 15	4 4	4 1	...	4 3	3 13
1932	10 13	3 4	3 3		5 4	8 3	3 13	...	...	3 5	7 14	4 8	3 14	7 2	4 1	4 3	3 15	...	4 1	3 6
1933	9 5	2 14	2 15		4 12	7 0	3 13	...	...	3 1	4 4	4 0	3 10	6 8	4 7	3 15	3 7	...	3 11	3 2
1934	7 11	2 11	2 11		4 8	5 13	3 11	...	...	2 12	4 4	3 8	3 9	5 15	4 9	3 9	3 1	...	3 5	2 14
1935	9 8	2 9	2 10		4 6	7 8	3 9	...	...	2 12	3 12	3 4	3 8	7 8	4 6	3 8	3 4	...	3 6	2 13
1936	8 7	2 9	2 10	2 14	3 14	5 12	3 5	...	...	2 11	4 6	2 14	3 3	5 8	4 9	3 7	3 3	...	3 3	2 12
1937	7 13	3 3	2 15	3 2	5 0	6 9	3 5	...	...	3 2	3 15	2 11	3 0	5 13	4 8	3 8	3 0	...	3 1	3 2
1938	8 15	4 6	3 7	3 4	5 9	6 6	3 11	...	...	3 12	4 0	2 14	3 9	6 15	4 15	4 1	4 6	...	3 14	3 12
1939	8 1	3 12	3 4	3 0	5 0	6 10	3 10	5 4	...	3 9	3 4	2 12	3 9	5 13	4 10	4 2	4 4	4 9	3 13	3 9
1940	8 14	3 11	3 5	3 2	5 4	6 7	3 12	5 0	5 0	3 9	4 0	2 14	3 8	5 8	4 9	4 6	4 8	4 8	3 14	3 9
1941	9 5	3 13	3 6	3 5	5 15	7 7	3 4	...	7 0	3 9	5 11	3 3	3 8	6 9	4 8	4 4	4 9	...	4 0	3 11
1942	9 15	4 8	4 0	4 10	13 4	13 11	5 8	...	8 3	4 6	7 2	3 6	5 0	13 15	5 0	4 10	5 4	10 14	4 14	4 7
1943	12 12	6 14	6 5	5 8	24 6	17 7	6 13	...	13 10	6 11	...	5 3	5 6	16 2	7 8	5 11	7 0	8 6	5 15	6 10

(a) Average for nine months only.

APPENDIX VII

Classification Of Collieries According To Output 1920-42

Year	Collieries producing up to 5,000 tons			Collieries producing from 5,001 to 10,000 tons			Collieries producing from 10,001 to 25,000 tons			Collieries producing from 25,001 to 50,000 tons			Collieries producing from 50,001 to 75,000 tons			Collieries producing from 75,001 to 100,000 tons			Collieries producing from 100,001 to 150,000 tons			Collieries producing from 150,001 to 200,000 tons			Collieries producing over 200,000 tons			Total No. of collieries
	No.	Output	%	No.	Output	%	No.	Output	%	No.	Output	%	No.	Output	%	No.	Output	%	No.	Output	%	No.	Output	%	No.	Output	%	
1920	248	504,225	2·9	127	904,471	5·0	127	2,131,740	11·9	93	3,227,097	18·0	25	1,493,172	8·3	32	2,721,069	15·1	18	2,157,419	12·0	7	1,193,082	6·6	10	3,624,957	20·2	687
1921	301	637,521	3·3	133	959,655	4·9	106	2,647,455	13·7	109	3,597,173	29·2	37	2,263,483	11·7	27	2,349,167	12·2	20	2,474,536	12·8	4	705,922	3·7	9	3,319,091	17·2	806
1922	366	756,273	3·9	140	979,562	5·2	155	2,519,159	13·3	110	3,785,456	19·9	44	2,746,796	14·4	23	1,925,233	10·1	16	1,842,955	9·7	8	1,396,756	7·4	8	3,038,565	16·0	870
1923	388	695,158	3·5	145	1,052,619	5·4	142	2,418,949	12·3	106	3,708,980	18·8	34	2,057,378	10·3	35	3,043,311	15·5	15	1,783,196	9·1	5	848,432	4·3	12	4,054,212	20·6	882
1924	286	588,890	2·8	143	1,031,310	4·9	148	2,465,307	11·6	110	3,952,184	18·7	38	2,295,940	10·8	28	2,431,542	11·5	22	2,632,761	12·4	7	1,156,204	5·5	13	4,624,628	21·8	795
1925	298	507,097	2·4	105	747,565	3·6	151	2,502,281	12·0	101	3,558,519	17·0	45	2,791,934	13·4	19	1,654,400	7·9	19	2,237,115	10·8	9	1,491,312	7·1	15	5,339,739	25·5	762
1926	277	417,930	2·0	78	551,442	2·6	119	1,988,893	9·5	104	3,665,637	17·5	36	2,240,118	10·6	22	1,933,172	9·2	18	2,204,782	10·5	16	2,698,841	12·9	13	5,300,249	25·2	683
1927	236	367,247	1·7	73	523,527	2·4	108	1,775,393	8·0	93	3,377,610	15·3	36	2,169,641	9·8	23	2,904,349	9·1	21	2,657,395	12·0	17	2,918,480	13·2	14	6,190,476	28·0	591
1928	171	310,289	1·4	62	466,558	2·1	89	1,549,320	6·9	89	3,245,732	14·4	41	2,427,909	10·8	19	1,682,118	7·4	25	3,053,293	13·5	13	2,232,556	9·9	18	7,371,390	33·6	527
1929	176	299,344	1·3	53	395,947	1·7	97	1,670,274	7·1	87	3,147,973	13·4	45	2,743,632	11·7	17	1,529,722	6·5	32	3,873,280	16·5	9	1,547,050	6·6	20	8,201,668	35·2	536
1930	176	305,829	1·3	50	361,732	1·5	107	1,807,257	7·6	89	3,179,813	13·4	42	2,568,218	10·8	24	2,092,034	8·8	28	3,337,916	14·2	11	1,962,938	8·2	20	8,189,962	34·4	547
1931	167	302,686	1·4	50	365,674	1·7	114	1,938,120	8·9	81	2,935,198	13·5	39	2,379,503	10·9	18	1,509,851	6·9	28	3,391,559	15·6	12	2,090,390	9·6	17	6,735,637	31·0	526
1932	164	255,292	1·3	56	415,248	2·1	93	1,571,164	7·8	86	2,979,914	14·8	37	2,262,467	11·2	18	1,570,316	7·8	24	3,013,347	14·9	12	2,024,774	10·0	17	6,064,259	30·1	507
1933	169	221,537	1·1	54	386,603	2·0	93	1,587,444	8·0	85	3,053,017	15·5	24	1,455,991	7·4	27	2,401,833	12·1	22	2,720,233	13·7	10	1,744,391	8·8	18	6,258,265	31·5	493
1934	135	202,310	·9	52	384,171	1·7	94	1,593,031	7·2	81	2,849,894	12·9	39	2,291,766	10·4	17	1,475,335	6·7	30	3,589,315	16·3	11	1,959,296	8·9	22	7,703,673	35·0	481
1935	123	216,607	·9	50	374,751	1·6	96	1,681,260	7·3	87	3,129,744	13·6	37	2,198,709	9·6	26	2,269,062	9·9	22	2,753,593	11·9	11	1,906,579	8·3	24	8,498,490	36·9	476
1936	138	217,693	1·0	57	408,948	1·8	99	1,676,317	7·4	75	2,669,428	11·8	42	2,561,815	11·3	25	2,164,644	9·6	26	3,119,813	13·8	9	1,578,132	7·0	23	8,208,197	36·3	494
1937	197	303,293	1·2	58	411,376	1·6	95	1,616,433	6·5	89	3,175,694	12·7	41	2,532,047	10·1	26	2,270,301	9·0	24	2,851,648	11·4	13	2,225,716	8·9	21	9,660,978	38·6	564
1938	212	342,440	1·2	61	432,760	1·5	102	1,721,494	6·1	95	3,266,794	11·5	41	2,462,387	8·7	31	2,667,902	9·3	31	4,093,727	14·4	14	2,361,271	8·3	27	11,023,124	38·9	617
1939	190	322,075	1·2	53	385,081	1·4	103	1,852,555	6·7	96	3,414,833	12·3	36	2,135,342	7·8	24	2,086,302	7·5	39	4,577,602	16·4	10	1,768,058	6·4	30	11,207,596	40·4	587
1940	176	258,754	·9	61	441,498	1·5	100	1,745,704	5·9	93	3,203,920	10·9	41	2,491,183	8·5	24	2,165,119	7·4	34	4,076,741	13·9	14	2,395,355	8·1	34	12,588,394	42·8	577
1941	194	273,980	·9	57	418,931	1·4	82	1,431,118	4·9	116	4,112,463	13·9	43	2,542,775	8·6	30	2,593,432	8·8	32	3,816,286	12·9	16	2,788,924	9·3	32	11,534,834	39·3	602
1942	255	357,819	1·2	82	568,829	1·9	124	2,222,455	7·6	125	4,387,881	14·9	38	2,435,487	8·3	24	2,050,205	7·0	33	3,955,199	13·4	13	2,282,263	7·8	30	11,175,219	37·9	724

APPENDIX VIII

British India

Despatches Of Coal, By Provinces, 1920—45

Year	Assam	Bihar	Orissa	Bengal	Punjab	Baluchistan	Central Provinces	N. W. F. P.	Sind	Total
1920	313,690	11,412,697	23,984	4,150,737	52,698	22,947	440,878	..	..	16,417,631
1921	300,327	11,153,760	61,704	3,523,944	64,029	35,136	641,829	..	..	15,780,729
1922	334,849	9,916,720	49,013	3,549,221	64,715	32,908	595,668	..	..	14,543,094
1923	314,043	10,931,120	31,310	3,681,632	61,919	28,276	461,212	..	..	15,509,512
1924	318,270	12,238,093	34,957	4,154,232	76,682	26,272	610,458	..	..	17,458,964
1925	300,543	12,046,315	31,550	4,396,939	73,088	20,688	626,816	..	..	17,495,939
1926	279,699	12,510,050	19,480	4,616,632	63,807	9,216	561,596	..	..	18,060,480
1927	302,205	12,964,763	19,349	5,105,514	62,447	8,503	615,808	..	..	19,078,589
1928	277,098	12,973,894	24,386	5,269,681	43,906	11,889	683,050	..	..	19,283,904
1929	300,922	12,938,915	28,818	6,469,132	41,213	10,547	823,020	..	..	20,612,567
1930	335,115	12,218,625	28,426	6,484,252	48,690	11,087	892,330	..	..	20,018,525
1931	253,138	10,505,848	22,346	5,913,279	54,889	13,906	918,068	..	..	17,681,474
1932	193,985	9,098,026	16,699	5,785,906 (a)	68,264	13,642	976,235	..	..	16,152,757
1933	178,288	8,902,193	18,088	5,999,683	91,552	8,603	1,156,728	..	..	16,355,135
1934	170,764	9,935,797	23,999	6,432,587	120,632	12,255	1,345,383	..	..	18,041,417
1935	206,484	9,884,532	23,388	6'691,892	141,216	4,681	1,434,585	..	..	18,386,778
1936	185,791	10,131,490	27,759	6,387,151	152,322	3,351	1,408,408	..	..	18,296,272
1937	235,770	11,873,099	40,947	6,011,517	248,036	9,488	1,424,960	..	..	19,843,817
1938	255,829	11,981,131	40,182	6,521,537	176,141	11,969	1,538,236	..	..	20,525,025
1939	264,189	12,277,841	54,675	7,058,744	188,937	14,255	1,626,167	..	..	21,484,808
1940	249,491	12,891,431	62,063	7,882,284	191,819	11,266	1,643,943	..	..	22,932,291
1941	245,845	13,051,788	80,220	7,416,328	174,121	15,195	1,664,495	..	255	22,648,247
1942	244,513	11,188,811	132,577	6,887,298	129,658	18,482	1,643,299	..	306	20,244,944
1943	222,587	11,882,585	109,354	6,174,463	100,316	31,013	1,500,209	..	1,790	20,022,317
1944	278,899	12,367,483	87,912	6,245,469	166,159	74,466	1,504,291	..	6,236	20,730,915
1945	285,086	13,406,750	95,768	6,544,766	155,157	117,127	1,443,406	..	11,043	22,059,103

(a) For Bengal and part of Bihar & Orissa.

NOTE.— Figures from 1920 to 1935 supplied by the Chief Inspector of Mines.
Figures from 1936 to 1945 supplied by the Chief Mining Engineer, Railway Board.

APPENDIX IX

Statement Showing The Coal Consumption Of Various Industries, 1920—45

Year	Railways	†Steel works (including Engineering works)	[Bunkers]	Exports	Cotton Textiles	Bricks & Tiles (including Potteries & Cement)	Soft Coke
1920	6,288,000	1,416,000 (623,040)	936,000	1,135,722	1,069,000	413,000 (289,100)	181,530
1921	6,189,000	1,439,000 (633,160)	1,582,000	275,571	1,116,000	444,000 (310,800)	151,417
1922	‡6,186,000	2,415,000	575,000	97,611	‡1,131,000	‡437,000	188,919
1923	6,184,000	1,852,000 (814,880)	819,000	136,575	1,082,000	452,000 (316,400)	220,061
1924	6,639,000	4,639,000 (2,041,160)	698,000	206,483	939,000	487,000 (340,900)	304,745
1925	6,710,453	5,130,000 (2,257,200)	640,006	216,090	941,000	481,000 (336,700)	415,969
1926	6,667,193	5,200,000 (2,288,000)	910,000	617,563	924,000	483,000 (338,100)	515,665
1927	6,920,919	5,260,000 (2,314,400)	873,000	576,167	830,000	565,000 (395,500)	608,612
1928	7,005,565	4,294,000 (1,888,360)	851,000	626,343	781,000	638,000 (446,600)	689,205
1929	7,043,891	5,231,000 (2,301,640)	905,000	726,610	1,538,000	691,000 (483,700)	754,115
1930	7,744,226	5,606,000 (2,466,640)	838,000	461,188	1,260,000	1,089,000 (762,300)	745,564
1931	6,749,910	4,716,000 (2,075,040)	656,000	441,249	1,311,000	758,000 (530,600)	722,597
1932	6,525,539	3,997,000 (1,758,680)	645,000	519,483	1,361,000	669,000 (468,300)	756,036
1933	6,748,298	4,092,000 (1,800,480)	579,000	426,176	1,547,000	644,000 (450,800)	823,073

†Figures in respect of steel works only are given in the statement in brackets. From 1936 the figures represent the actual consumption and the rest are only estimated figures.

‡Figures taken from G. S. I. Memoirs No. LIX.

APPENDIX IX—*contd.*

Year	Railways	†Steel works (including Engineering works)	Bunkers	Exports	Cotton Textiles	Bricks & Tiles (including Potteries & Cement)	Soft Coke
1934	7,232,008	4,657,000 (2,049,080)	573,000	330,233	1,660,000	709,000 (496,300)	860,478
1935	7,399,718	5,583,000 (2,456,520)	629,000	217,584	1,531,000	792,000 (554,400)	888,493
1936 . . .	7,603,011	(2,607,232)	599,000	197,212	1,697,000	858,000 (600,600)	915,719
1937 . . .	8,054,361	(2,737,129)	559,000	873,310	1,704,000	940,000 (658,000)	830,784
1938 . . .	8,284,027	(2,525,065)	595,000	1,343,033	1,979,000	1,047,000 (732,900)	889,671
1939 . . .	8,457,687	(2,912,927)	602,000	1,688,092	1,791,000	1,224,000 (856,800)	888,982
1940 . . .	8,738,356	(3,223,187)	487,000	2,112,281	2,029,000	1,241,000 (868,700)	962,825
1941 . . .	9,504,582	(3,395,850)	480,000	1,734,580	2,435,000	1,382,000 (967,400)	957,553
1942 . . .	9,348,014	(3,235,108)	347,000	422,001	2,258,000	1,476,000 (1,033,200)	431,858
1943 . . .	9,784,443	(2,988,800)	...	346,692	...	...	354,835
1944 . . .	10,144,863	(2,647,043)	580,939	262,628	1,599,976	970,214 (736,289)(*a*)	445,721
1945 . .	9,173,727(c for 44-45)	(2,611,488)	1,140,700	122,111	2,010,820	1,243,356 (889,560)(*b*)	547,292

Figures are in respect of official financial year. Figures from 1925-26 have been obtained from the C.M.E. Rly. Board and rest are taken from Indian Coal Statistics.	Figures in brackets relate to only steel. 1936 and onwards are actuals and the rest estimated.	...	...	...	Figures in respect of cement are given in brackets. 1944-45 figures and the rest are only estimated figures.	Figures supplied by C. M. E. Rly. Board.

†Figures in respect of steel works only are given in the statement in brackets. From 1936 the figures represent the actual consumption and the rest are only estimated figures.

(*a*) 736,289 in respect of cement only.

(*b*) 889,560 in respect of cement only.

(*c*) Includes oil fuel at 0.55 ton of oil fuel in Class 1 Railway.

APPENDIX X

Statement Showing The Quantity Of Coal Exported And Coal Bunkered At Indian Ports, 1920-42

Year	Coal exported (including coke and patent fuel)	Coal bunkered at Indian Ports
1	2	3
	(Tons)	(Tons)
1920	1,224,758*	1,967,000
1921	275,571	1,582,000
1922	77,111	796,000
1923	136,575	819,000
1924	206,483	1,034,000
1925	216,090	1,052,000
1926	617,563	1,410,000
1927	576,167	1,317,000
1928	626,343	1,277,000
1929	726,610	1,376,000
1930	461,188	1,272,000
1931	441,249	1,109,000
1932	519,483	1,077,000
1933	426,176	967,000
1934	330,233	944,000
1935	217,584	1,020,000
1936	197,212	990,000
1937	873,310	867,000
1938	1,343,033	884,000
1939	1,688,092	927,000
1940	2,112,281	762,000
1941	1,734,580	817,000
1942	422,001	886,000

* Represents for the official year 1920-21.

APPENDIX XI

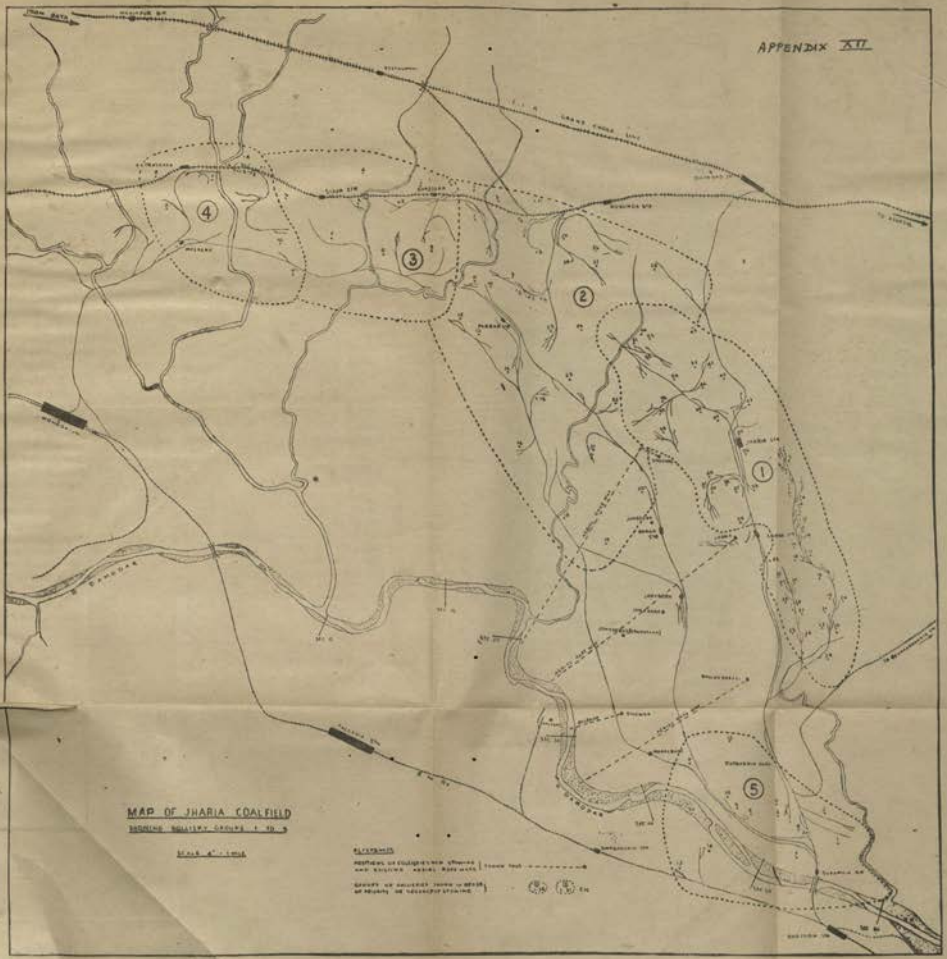
Statement Showing Electricity Capacity In The Coalfields.

Name of Power Stations	Existing generating capacity K.W.	Extensions projected and in hand	Total generating capacity by 1947	Maximum demand K.W. 1939	Maximum demand K.W. 1945	Estimated maximum demand 1948	Remarks
1	2	3	4	5	6	7	8
A.—Karanpura Group							
Argada	700	...	700	360	210	575	
Bhurkunda	1,000	1,000	2,000	250	370	825	
						+1,000	Saunda-Sayat-Religara Collieries. Extensions to Bhurkunda P. H. are under consideration to meet this demand.
B.—Bokaro Group							
Kargali	3,000	1,500	4,500	1,000	1,400	2,700	Plant available in India—Extensions could be completed by August 1946.
West Bokaro	...	2,000	2,000	...	...	1,600	Plant would be commissioned by March, 1948.
C.—Giridih Group							
Giridih	4,650	2,500	4,650	3,260	4,000	Figures not available.	New set will take the basic load. Existing set is old and will be only used as standby. Extensions will be completed by March 1947.
D.—Jharia Coalfields							
Sijua-Jherriah	15,000	4,000	19,000	8,800	10,300	16,000	(1) Present maximum capacity of plant 12,000 K.W. only.
E. S. Co. Loyabad . . .	(12,000 Maximum) Limited by Boiler Capacity.	...	(16,000 max)	...	...	...	(2) 2—2,000 K. W. Packaged Power Station units imported by Government will be located at Loyabad will be ready by July/August 1946. (3) Inter connection with Jamadoba P. H. carried out in 1945 capable of giving 1,000 K.W. extra capacity in emergency.
Jamadoba P. H. . . .	7,000	4,000	11,000	2,100	4,500	6,250	Capacity of 1—4,000 K.W. ASEA set derated to 3,000 K. W. New set will be commissioned by end of 1946.

APPENDIX XI—contd.

Name of Power Stations	Existing generating capacity K.W.	Extensions projected and in hand	Total generating capacity by 1947	Maximum demand K.W. 1939	Maximum demand K.W. 1945	Estimated maximum demand 1948	Remarks
1	2	3	4	5	6	7	8
Mohuda P. H.	1,000	1,000	2,000	320	560	...	1,000 K. W. Turbo set being transferred from Seebpore P. H. by 1946.
Other Colliery power stations owned by individual collieries.	15,500	...	15,500	...	7,000	...	Some of the existing generating and boiler plant is in poor condition.
E.—Raneeganj Coalfield.							
Associated Power Co., Seebpore	6,500	1,500 (—1,000)	7,000	2,500	3,000	4,500	New set will be ready by June 1947. 1,000 K.W. set being transferred to Mohuda (*see* above).
Dishergarh	10,000 (restricted by boiler capacity).	48×10^3 lbs./hr. boiler plant.	13,500	6,200	7,500	12,000	New Boiler plant commissioning March 1947. Inter connection made between Seebpore and Dishergarh P. H. to enable interchange of power upto 1,500 K.W.
F.—Pench Vally Coalfields							
Barkui	800	...	800	343	525	1,000	The question of establishing a power station in the Pench Valley by the C. P. Government under consideration.
Datla	450	...	450	144	223		
G.—Other Collieries in Orissa and C. P.							
Jhagrakhand (Korea State) .	750	3,000	3,750	300 (1941)	Figures not available.	Figures not available.	New plant expected to be commissioned about March, 1948.
Ballarpur	600	...	600	Figures not available.	500	Figures not available.	
Chirimiri	600	...	600	Figures not available.	300	Figures not available.	

APPENDIX XII



MAP OF JHARIA COALFIELD

SHOWING QUALITY ZONES 1 TO 5

SCALE 4" = 1 MILE

APPENDIX XIII

Statement Showing Cost Of Delivering Sand To Collieries

Name of Colliery	Cost per ton of delivering stowing material at pit head (including depreciation, etc.)
1943-44	Rs. A. P.
1. New Marine Colliery	...
2. Dishergarh Colliery (Dishergarh Seam)	0 3 3.3185
3. Dishergarh Colliery (Sanctoria Seam)	0 3 9.5323
4. Bejdih Methani, Dhemo-Main	0 6 6.472
5. Angarpathra Colliery	0 4 5.9093
6. Ekra Khas No. 3A Incline (12 Seam)	0 7 8.8888
7. Ekra Khas No. 14 Incline (14 Seam)	0 7 0.6112
8. Ekra Khas No. 2 Quarry (13 & 14 Seams)	0 6 5.078
9. Victoria Colliery	0 6 8.7076
10. Begonia Colliery	0 5 6.1913
11. Ramnagar Colliery	0 3 9.10102
12. Chasnalla (17A & 14 Seams)	0 4 1.843
13. Ballarpur Colliery	0 4 4.95
14. Jamadoba Colliery	0 7 6.376
15. Digwadih Colliery	0 7 0.2629
16. Seetalpur (No. 3 Pit)	0 4 5.8559
17. Seetalpur (No. 4 Pit)	0 2 6.61778
18. Sodepur (No. 9 & 10 Pits)	0 2 3.4078
19. Poidih Colliery	0 1 11.9294
20. Chanch Colliery	0 4 11.8717
21. Parbelia Colliery	0 3 0.8773
22. Ena (No. 4 & 5 Pits)	0 5 5.394
23. Lodna (No. 4 & 5 Pits)	0 1 5.5123
24. Sripur Colliery	0 7 6.733
25. Haripur Colliery	0 3 8.88
26. Loyabad Colliery	0 4 10.157
27. Amlabad Colliery	0 3 10.036
28. North Kujama Colliery	0 4 11.6
29. Sitanala Colliery	0 4 10.850
30. Gaslitan Colliery	0 6 1.4966
31. Mudidih Colliery	0 6 5.835
32. Bhulanbararee Colliery	0 6 1.1438
33. Sendra Colliery	0 3 11.679
34. Standard Colliery	0 7 7.0740
35. Saltore (No. 4 Pit)	0 2 0.8781
36. Saltore (Island)	0 2 7.3124
37. Khas Jharia Colliery	0 4 3.386
38. Swang Colliery	0 5 10.350
39. Khurburbaree Colliery	0 5 4.776

Name of Colliery	Cost per ton of delivering stowing material at pit head. Direct charges (excluding depreciation of Machinery, repairs etc.)
	Rs. A. P.
1944-45	
1. Bhagabond Colliery	0 5 10.466
2. Bhulanbararee Colliery	0 4 5.515
3. Sendra Colliery	0 7 4.824
4. Standard Colliery	0 3 3.719
5. Saltore (No. 4 Pit)	0 2 0.323
6. Saltore (Island)	0 1 7.409
7. Jogta Colliery	0 4 11.31
8. Kurhurbaree Colliery	0 5 1.662
9. Digwadih Colliery	0 6 1.407
10. Jamadoba Colliery	0 6 5.873
11. Sijua Colliery	0 14 0.79
12. Amlabad Colliery	0 3 8.511
13. Ballarpur Colliery	0 6 0.854
14. Begonia Colliery	0 6 8.08
15. Union Angarpathra Colliery	0 5 5.843
16. Gaslitan Colliery	0 6 8.133
17. Victoria Colliery	0 5 3.184
18. Khas Jharia Colliery	0 3 10.71
19. Bhaga Colliery	0 8 0.805
20. Sripur Colliery	0 7 6.356
21. Dishergarh (Dishergarh seam)	0 3 7.3121
22. Sitanala Colliery	0 7 7.66
23. New Marine Colliery	0 4 6.670
24. Seetalpore (3 Pit)	0 5 0.546
25. Seetalpore (4 Pit)	0 2 6.446
26. Parbelia Colliery	0 3 2.777
27. Sodepure (9 and 10 Pits)	0 1 11.347
28. Poidih Colliery	0 1 6.891
29. Ena (4 & 5 Pits)	0 10 0.227
30. Chanch Colliery	0 4 3.115
31. Chasnalla Colliery	0 4 6.026
32. Ramnagar Colliery	0 4 0
33. Ekra Khas (13 & 14 seams)	0 5 5.22
34. Ekra Khas (12 seam)	0 6 7.76
35. Loyabad Colliery	0 15 6.885
36. Sawang Colliery	0 5 3.113
37. Bhaga (15 seam)	0 9 2.121

APPENDIX XIV

Leases Granted By The Panchakote Raj, 1936-45

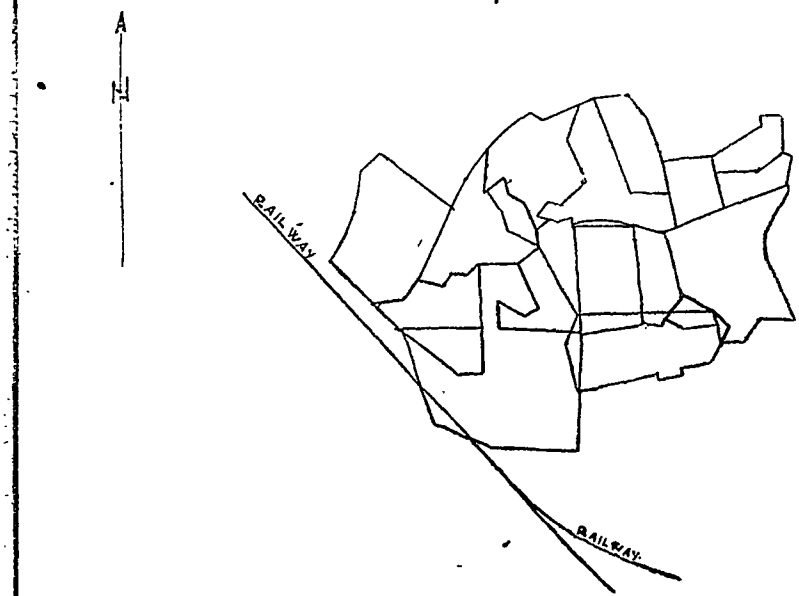
Year	No. of leases granted	Total area covered by the leases granted (in bighas)	Maximum area leased in the year as a single unit (in bighas)	Minimum area leased in the year as a single unit (in bighas)	Total royalty recovered or recoverable (in Rs.)	Maximum rate of royalty charged (in Rs.)	Minimum rate of royalty charged (in Rs.)	Total Salami recovered or recoverable (in Rs.)	Remarks
1936	5	about 7526	3647	484	63,707 9 6	0 7 0	0 4 6	2,26,158 15 6	
1937	6	„ 12665	4888	556	18,015 12 0	0 6 0	0 4 0	1,41,495 0 0	
1938	7	„ 6158	1805	15	500 0 0	0 6 0	0 3 0	1,39,375 0 0	
1939	1	„ 87	87	87	..	0 6 0	0 6 0	1,754 8 0	
1940	..	..	..	..	..	..	..	..	
1941	1	„ 264	264	264	..	0 4 0	0 4 0	10,560 0 0	
1942	..	..	..	..	..	..	..	..	
1943	1	„ 565	565	565	..	0 7 0	0 7 0	14,141 14 0	
1944	..	..	..	..	..	..	..	..	
1945	..	..	..	..	..	..	..	..	

Leases Granted By The Burdwan Raj, 1936-45

1936	Nil	..	..	..	..	..	..	..
1937	1	400	400	..	2,000 0 0	0 4 0	0 4 0	8,000 0 0
1938	Nil	..	..	..	..	..	..	..
1939	Nil	..	..	..	..	..	..	..
1940	Nil	..	..	..	..	..	..	..
1941	Nil	..	..	..	..	..	..	..
1942	9	2616	1366	43	8,872 0 0	0 4 0	0 1 0	9,393 0 0
1943	2	351	261	90	613 0 0	0 4 0	0 4 0	3,105 0 0
1944	14	10583	3287	36	8798 0 0	0 7 0	0 1 0	1,02,027 0 0
1945	16	27217	7771	15	11,051 0 0	0 12 0	0 1 6	4,23,919 0 0

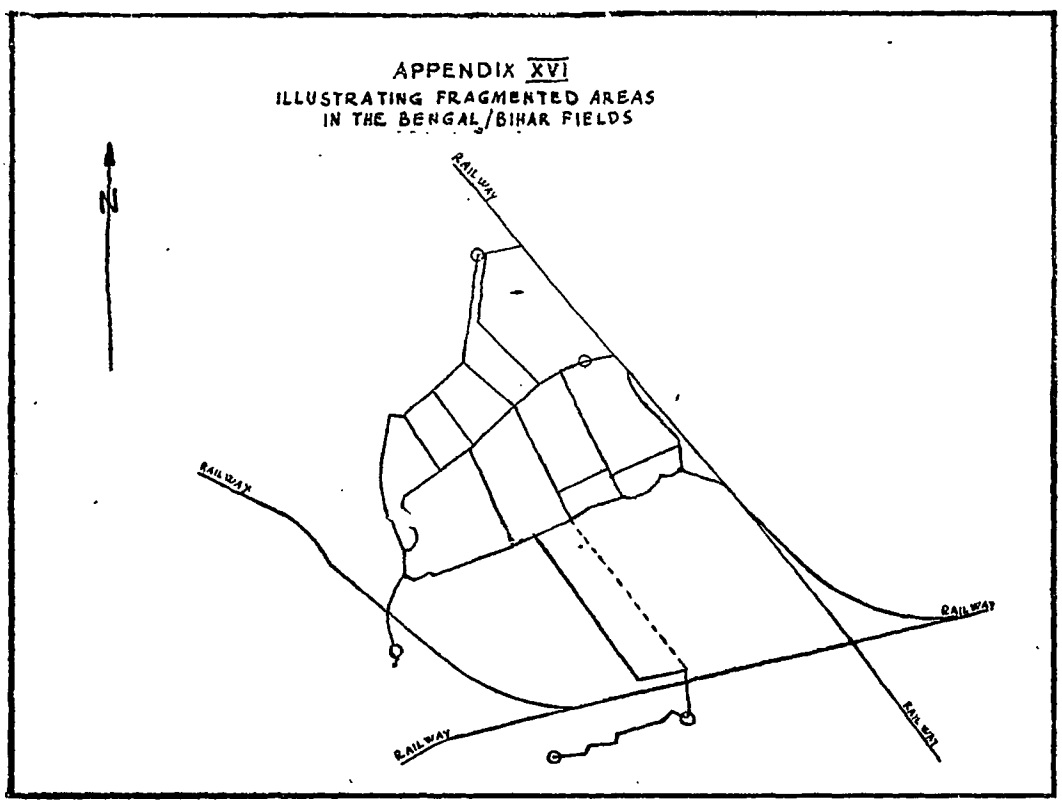
N.B.—In column 6, the total yearly minimum royalty reserved in the leases has been shown. As the properties have not been developed as yet is not possible to give the figure of total royalty recovered as required under this head.

APPENDIX XV
ILLUSTRATING FRAGMENTED AREAS
IN THE BENGAL/BIHAR FIELDS



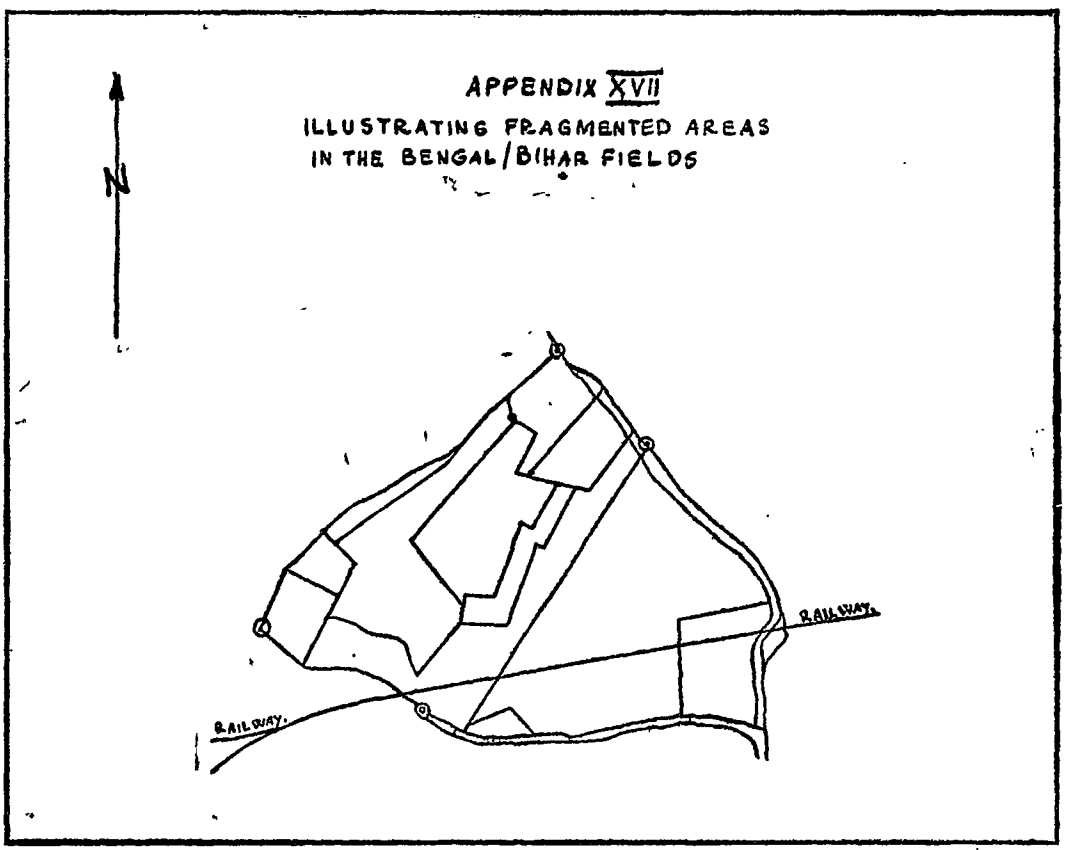
APPENDIX XVI

ILLUSTRATING FRAGMENTED AREAS
IN THE BENGAL/BIHAR FIELDS

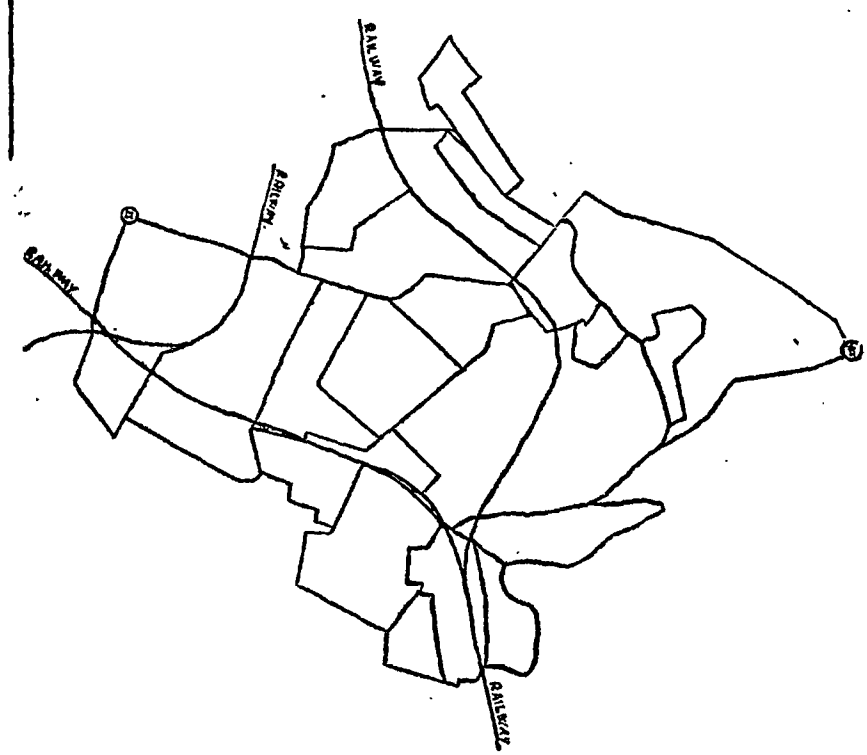


APPENDIX XVII

ILLUSTRATING FRAGMENTED AREAS
IN THE BENGAL/BIHAR FIELDS



APPENDIX XVIII
ILLUSTRATING FRAGMENTED AREAS
IN THE BENGAL / BIHAR FIELDS



APPENDIX XIX

Statement Showing Average Coal Prices, 1920-43

Year	Average
	Rs. As. P.
1920	5 6 0
1921	6 10 0
1922	8 1 6
1923	7 13 0
1924	7 4 6
1925	6 4 0
1926	4 15 0
1927	4 2 6
1928	3 13 0
1929	3 10 6
1930	3 13 0
1931	3 10 6
1932	3 2 0
1933	2 12 6
1934	2 9 0
1935	2 8 6
1936 } 1937 }	Information not available.
1938	3 12 0
1939	3 9 0
1940	3 9 0
1941	3 11 0
1942	4 7 0
1943	11 7 0

APPENDIX XX

Precis Note On Coal Distribution Organisation

Collieries submit to this office on the prescribed form their anticipated output of coal in terms of Steam, Slack, Rubble and Run-of-Mine six weeks to a month in advance of the month to which the figures relate.

These figures are summarised in this office in terms of Grades for each coalfield and each sub-section of each coalfield so that it can be seen at a glance as to the different grades of coal available for distribution in each field and on each section of each field. In addition to these figures, the Regional Coal Controller (D), Dhanbad, also submits for the corresponding month stocks both Government and private that would be available at the different collieries throughout the coalfields under his control.

The Allocation Officer attached to this office thereafter prepares tentative coal allocation proposals for the month taking into account any special features or transport difficulties that may present themselves during the month of operation, such as, during the month we may be faced with the Harvest Season which would mean an exodus of colliery labour with consequent drop in output, or Railways may have to handle seasonal traffic which factor would have a direct repercussion on the available transport, and although there may be an abundance of coal, there may not be adequate transport to move it. Similarly, there may be a shortage of coal and abundance of transport particularly during the monsoon months.

After studying these special features the Allocation Officer decides as to whether he will accept the collieries anticipated raising figures cent. per cent. or whether a percentage cut should be exercised on the output figures so as to ensure that the coal to be programmed will actually be available. The adjusted anticipated output submitted by collieries together with stocks constitute the available coal for distribution.

Each of the various industries and consumers throughout the country is classified alphabetically under Class "A" to "K", "A" representing Bunker and Export coal; "B" Railways and Essential Steamer Services; "C" Public Utility Concerns such as Electric Supply Companies, Gas Companies and Water Works; "D" representing Iron & Steel Works and allied industries such as Refractories, Potteries, etc.; "E" Defence requirements and so on. Different class of consumer is controlled by one of the Directorates or recognised Associations and demands are placed on this office by each of these Directorates or Associations month to month. The Allocation Officer has to decide as to the extent to which he can meet these demands each of which is required to be determined in terms of Grades of coal; for instance, Bunker, and Export demand is selected coal and therefore when sending his tentative proposal against this demand, he is required to study the availability of selected coal before he decides to meet the demand in full. If he is unable to meet the demand in full he will exercise a cut and cover this cut with a remark in his proposal. Similarly the kind of coal available has also to be taken into consideration. We may have an abundance of slack coal which must be moved to avoid any hold up in production at the various collieries producing steam coal for important consumers. If, therefore, slack coal is not moved the output of steam coal is automatically affected. There are certain consumers that take slack coal only such as Cement Factories, Electric Supply Companies, Paper Mills, Jute Mills and so on. If, therefore, there is an abundance of slack coal available, the demands, against these industries would be met as far as practicable in full.

The tentative proposals drawn up by the Allocation Officer are in the first instance put up to the Dy. Coal Commissioner (D), who gives his final decision and after joint discussion finalises the proposals which are thereafter submitted to the Central Priorities Committee, Government of India, New Delhi. These proposals are required to be submitted by the 7th or 8th of the month preceding that to which the figures relate. A meeting is usually held in New Delhi about the 15th and the final figures decided on, are returned to this office with any amendments, *i.e.*, addition or reduction as agreed upon by the various Directorates and other representatives who discuss the proposals on an all India basis, taking into consideration all special features in regard to the economic life of the country as a whole together with the transport position on the various railways and the availability of shipping, etc.

On receipt of the final figures from New Delhi the Allocation Officer gives to each executive officer of this office a copy of the proposals as agreed upon by the Central Priorities Committee and each officer in turn contacts the Directorates or Associations from whom the break-down for the month in terms of individual consumers under each industry is received *i.e.*, if the total allocation against Cotton Mills is 1,80,000 tons for the month, the Textile Commissioner, Bombay, will advise the executive officer of this office of the break-down of the quotas in terms of individual mills' requirements. The said officer will thereafter proceed to get out Priority sanctions for each individual mill. Similarly, the Iron & Steel Controller will decide as to the quota each of the Iron & Steel Works should have and the Officer controlling Iron and Steel Works will similarly get out Priority sanctions for each individual iron and steel consumer. These Priority sanctions that are issued by this office have to pass through the allocation section, *i.e.*, the Allocation Officer who submits the tentative proposals to New Delhi is required to nominate the colliery for supply and maintain a running book balance of any coal, that is, allocated to any consumer so as to ensure that no colliery is over-booked with orders, also when allocating coal he is required to take into consideration the various pilot limitations together with the loading accommodation provided by the Railways at each individual colliery *e.g.*, a colliery may have output of say 2,000 tons with siding accommodation of only 1 wagon. He could not, therefore, allocate the

entire 2,000 tons in view of the limited siding accommodation. The maximum amount of coal that could be allotted to such a colliery would be 640 tons for the month. In such cases in order to move the coal if it is practicable, road permits are issued on such a colliery to allow of a portion of the output being despatched by road transport.

The Priority sanctions issued by this office are sent to the various Railway Authorities controlling the supply of wagons to collieries. In addition, one copy of the sanction is sent to the Directorate or Association that has recommended the consumer, one copy to the Colliery Owner or Managing Agents, one copy to the Allocation Officer attached to this office, one copy to the consumer's middleman or agent, if any, and so on.

The Railway Authorities on receipt of these Priority sanctions summarise them in registers taking into account the name of the consumer, the class of industry under which the consumer has been allocated coal, the total number of wagons in terms of tons and wagons, the Priority sanction number and date and the colliery on which the order has been placed.

The registers are maintained progressively and a careful check exercised to ensure that a particular consumer does not receive more than the number of wagons allocated to him.

Each colliery that has orders placed on it for the despatch of coal places an indent on the Railway Authorities concerned on a prescribed form 72 hours in advance of actual time of loading wherein the colliery is required to show the Priority sanction number and date, the consumer, the destination station to which the coal is required to be booked, the kind of coal that is to be loaded and the number of wagons a colliery proposes to load for each particular consumer. These indents are carefully checked against the progressive register maintained by Railways and if the indent is in order, it will be accepted, if not in order it will be rejected, *i.e.*, if a colliery has no order for a particular consumer and places an indent for such a consumer, the Railway Authorities would reject such an indent from a colliery. Similarly if a colliery indented for a station or route which was restricted from any cause, *e.g.*, due to accident, flood, or from any other cause such an indent would similarly be rejected. The Railway Authorities are required to submit to this office a daily statement summarising all such rejected indents. The accepted indents are summarised by the Railway Authorities in terms of Industries and routes, *i.e.*, if the indent received from the colliery is for a station in the Punjab, the figure would be indicated under the class of Industry together with the junction (Saharanpur) through which the traffic will pass. In addition the indents are also prepared for each Pilot Section and the total of the Pilot Sections summarised in an Indent and Summary form which is submitted daily to this office along with the pilot sheets. The reason for this is that certain pilot sections have limited working capacities and it is not possible to make an allotment when the indent is in excess of the pilot working capacity.

When these pilot sheets and the summary of indents are received in this office they are handled by the Allotment Officer attached to this office. The total number of pilot sheets and summaries received for the Bengal and Bihar coalfields are 98. On receipt, the Allotment Officer has to contact the Headquarter office of the Railway concerned *i.e.*, the E. I. Rly. in the case of E. I. Rly. collieries and B. N. Rly. in the case of B. N. Rly. collieries. The Headquarter office advises our Allotment Officer of the number of wagons available for distribution. The Allotment Officer thereafter studies the pilot sheets and summaries and has to decide on the nature of allotment to be made for the day taking into account the priority of industries, the tonnage allocated for the month to each industry, the various railway junction limitations and any special feature such as restrictions on booking in particular direction due to transport difficulties and so on. In finalising his allotment for the day, he is required to ensure that he does not allot more wagons than have been offered by the Railway Authorities, that his allotment is as far as practicable in order of priority of industries but must not lose sight of the fact that a particular industry carrying a lower priority may have a very big quota of coal which must move from the start of the month and cannot be left over till the latter end of the month when it would not be practicable to move the quota. Such an industry would be the Cotton Industry, the total quota of which is 1,80,000 tons which means a daily allotment of near on 200 to 250 wagons throughout the month. In addition he must ensure that each pilot is allotted that number of wagons as would be consistent with the working capacity of the particular pilot. Similarly, that the traffic to move through a particular junction does not exceed the limitation imposed by the various Railways for that particular junction, also he must take into account the various bottlenecks which have a very limited capacity and ensure that the available limited capacity is utilised to the full day to day as any short fall on such traffic cannot be made up during the remaining days of the month. Finally when deciding on his allotment he must take into account any deterioration in the wagon position as experienced by him ; for instance, if the total average loading of Bengal and Bihar coalfields is 3,000 wagons per day while the Railway Authorities are consistently offering a lesser number of wagons for allotment, he should regulate his allotment in terms of traffic lead and check the various Returns received from Railways to see where wagons are being held up and so ensure the Quick Turn Round of wagons so that we might work to the daily average figure as drawn up in the allocation proposals.

The final allotment figures are phoned to the Railway Allotment Officers in the Coalfields. The orders received from this office are then checked against the duplicate pilot sheets and summaries submitted by the Railway to this office and necessary challans prepared for each colliery. These challans are sent to the collieries and indicate to the colliery, the consumer, destination station etc., on whose account wagons have been allotted. Meanwhile the Railway Authorities issue orders to the various Depot Stations or Yards to make up trains in keeping with the allotment made by this office for each pilot section, *i.e.*, if the totol indents received from collieries served by a particular pilot were in the region of 100 wagons while the working capacity of thesaid

section is 60 wagons, the allotment due to shortage of wagons may be only 50 wagons. The Railway Authorities would, therefore, arrange with the Yard Staff to prepare a train of empties composed of 50 wagons for supply to collieries served by that particular pilot. I should mention here that every wagon of coal that passes out of the coalfields is required to be weighed at the Weigh Bridge. Each colliery is, therefore, served by a particular Weigh Bridge and special staff are appointed at this Weigh Bridge who have records supplied to them of the wagons allotted to each individual colliery served by the said Weigh Bridge. When the loaded wagons are drawn out from the various collieries they are weighed at the Weigh Bridge and also checked to see that wagons are being booked to those consumers on whose account they have been allotted by this office. If a colliery inadvertently books a wagon to a consumer other than one to whom a wagon has been allotted such a wagon would be detained on the Weigh Bridge and a reference made to this office or the wagon would be returned to the colliery for unloading or relabelling for the correct consignee.

When the wagons are booked, particulars of such booking are again summarised by the Railway Authorities concerned and such particulars submitted to this office in duplicate. One copy of this return is handled by the allotment section who keeps a running account of the number of wagons supplied to each individual consumer under each class of industry day to day. The second copy of this return is made over to the allocation section who keeps a similar record colliery-wise, *i.e.*, the allocation section is aware of the various orders placed on each individual colliery for each individual consumer and from these returns it can be seen at a glance whether the colliery is loading wagons on account of a more important or less important priority consumer and necessary action can be taken if it is found that a colliery is defaulting on a more important consumer to the advantage of a less important consumer. Similarly in the allotment section it can be seen whether each individual consumer under each industry is receiving adequate wagons day to day throughout the month against the number of wagons sanctioned.

Booking particulars received from the various Railway Authorities both for the Bengal and Bihar coalfields together with the out-lying coalfields are summarised in this office, weekly, and the total tonnage despatched against each industry is determined and a weekly message sent to the Central Priorities Committee, New Delhi, which indicates the total despatches against each industry in terms of tons as against the weekly tonnage allocated to that particular industry.

In so far as the operation of out-lying coalfield is concerned the method adopted is a little different to that in force in the Bengal and Bihar coalfields. The priority sanctions issued by this office are summarised in exactly the same way but collieries do not place their indents for any particular consumer. They simply place an indent for the number of wagons they are capable of loading and mention the kind of coal they intend to load *i.e.*, Steam, Slack or Rubble, etc. The Railway Allotment Officers on receipt of these indents check that against their progressive priority sanction registers and advise the Weigh Bridge Staff of the various consumers on whose account the wagons are to be booked. All that the colliery does is to indicate on the Wagon card label the number of wagon, the owning Railway, and the kind of coal loaded therein. The other particulars are entered by the Wrigh Bridge staff. The Railway Allotment Officers when making an allotment try as far as possible to load these wagons to consumers in a particular direction so as to form up a full train eliminating unnecessary shunting and marshalling of wagons as far as practicable but cannot totally preclude the order of priority of industries except in the case of allotment of traffic which is required to pass through various Railway bottlenecks with a very small junction working capacity when the order of priority cannot be observed.

This practice is in force on the Pench and Chanda, Central India, and Talcher coalfields.

In so far as the Singareni coalfields are concerned the Coal Controller, Secunderabad, advises this office of the total output and submits his tentative proposals of allocation to this office for final acceptance. Unless there is something seriously wrong with the tentative proposals submitted by the Coal Controller, Secunderabad, these are invariably accepted cent. per cent. or if special circumstances demand that additional orders be placed on these coalfields for a particular consumer such as M. & S. M. Rly. and Mysore State Railway or some such special feature, the tentative proposals are readjusted and returned to the Coal Controller, Secunderabad. Other procedures remain very much the same as practised in other out-lying coalfields.

In so far as the Baluchistan and Punjab Collieries are concerned periodical meetings are held with the Controllers of these coalfields and they have basic programmes to work to month to month. If there is any marked fluctuation in the output one way or another this office is advised in good time and necessary action by way of adjustment taken.

Similarly in the case of Assam coalfields, the Coal Controller, Assam Collieries, prepares his tentative allocation proposals against his anticipated output for each year and discusses the entire issue in this office where it is decided as to whether the tentative proposals of the Controller, Assam Collieries, should be accepted or modified as required. Thereafter the Coal Controller, Assam Collieries, works to his basic programme as agreed to by this office for the entire year. The figures of output and allocation from the Baluchistan, Punjab and Assam Collieries are not taken to account in this office for allocation proposals and allotment or any records indicating despatches which are submitted to the Central Priorities Committee, New Delhi. We do, however, make the best utility of the coals offering in these out-lying fields.

Sd. G. FARUQUE,

Dy. Coal Commissioner (Distribution),

15-1-46.

APPENDIX XXI

COLLIERY CONTROL ORDER 1945.

NOTIFICATION

New Delhi, the 29th December, 1945

No. 2129.—In exercise of the powers conferred by sub-rule (2) of rule 81 of the Defence of India Rules, the Central Government is pleased to make the following Order, and to direct with reference to sub-rule (1) of rule 119 of the said Rules, that notice of the Order shall be given to the public by publication of the same in the *Gazette of India*, and by the issue of a press note indicating the nature of its provisions.

1. (1) This Order may be called the Colliery Control Order 1945.
(2) It extends to the whole of British India.
(3) It shall come into force at once.
(4) The Colliery Control Order, 1944, is hereby repealed :

Provided that any thing done under any of the provisions of that Order shall be deemed to have been done under the corresponding provisions of this Order.

2. In this Order, unless there is anything repugnant in the subject or context,—

(1) " coal " includes coke ;

(2) " colliery " means any mine or open working where the getting of coal is the principal object of the mining quarrying or other operations carried on therein, and includes a plant for the production of coke ;

(3) " dispose of " includes—
(*a*) agreeing or offering to dispose of,
(*b*) the disposal of—
(*i*) ownership or any proprietary interest,
(*ii*) the right to possession,
(*iii*) possession, whether or not accompanied by any disposal of ownership or of any proprietary interest or of the right to possession.

(4) " owner " and " agent " when used in relation to a colliery have the same meanings as in the Indian Mines Act, 1923.

3. (1) The Central Government may constitute a Board to be called the Coal Control Boa rd to advise the Central Government and its officers on all matters connected with the working of this order in general and clauses 4, 6, 8, 10 and 11 in particular.

(2) The Coal Control Board shall consist of the following members :—
(*i*) The Honourable the Supply Member of the Government of India.
(*ii*) Two persons nominated by the Indian Mining Association.
(*iii*) One person nominated by the Indian Mining Federation.
(*iv*) One person nominated by the Indian Colliery Owners' Association.
(*v*) One person nominated by the Central Provinces and Berar Mining Assocaition.
(*vi*) One person nominated by the Associated Chambers of Commerce.
(*vii*) One person nominated by the Federation of Indian Chambers of Commerce and Industry.
(*viii*) One person nominated by the Indian Coal Merchants' Association, Jharia.
(*ix*) The Coal Commissioner with the Government of India.
(*x*) The Deputy Coal Commissioner (Production).
(*xi*) The Deputy Coal Commissioner (Distribution).
(*xii*) The Joint Financial Adviser (Munitions Production).

(3) The Central Government shall nominate one of the members to be the Chairman of the Board for such period as it thinks fit.

(4) The Chairman of the Board shall have power to preside at all meetings of the Board and to nominate a member to preside at any meeting of the Board which he himself is unable to attend.

(5) No act done by the Board shall be questioned on the ground merely of the existence of any vacancy in, or any defect in the constitution of the Board.

4. The Central Government may, by notification in the *Gazette of India*, fix the price at which coal may be sold by colliery owners ; and any such notification may fix different prices—
(*i*) for different grades of coal and coke ; and
(*ii*) for different collieries.

5. (1) No colliery owner, and no person acting on behalf of a colliery owner, shall sell, agree to sell, or offer to sell coal at a price different from the price fixed in that behalf under clause 4.

(2) Where a colliery owner has, whether by himself or by another, entered into an agreement for the sale of coal at a price different from the price fixed in that behalf under clause 4, no coal shall be delivered in pursuance thereof unless the agreement is by mutual consent so revised as to bring the price into conformity with the price fixed under clause 4.

6. (1) Where a colliery owner has signified to the Deputy Coal Commissioner (Distribution) in writing his willingness to sell direct to consumers and an allotment is made by the Deputy Coal Commissioner (Distribution) to a consumer with his consent for such direct sale, the coal shall be delivered to the consumer at the price fixed under clause 4, and no commission or other charges shall be paid in addition, except that where a broker is employed, a brokerage not exceeding six annas per ton may be paid by the colliery owner to the broker.

(2) Where a consumer purchases coal through a *del credere* agent, such agent shall not, on the sale of such coal, charge or receive from the consumer a margin over the price fixed under clause 4 which exceeds :—

(*a*) four rupees per ton in the case of hard coke, or

(*b*) one rupee eight annas per ton in the case of soft coke or coal ;

and, if, in any such transaction as aforesaid, a broker is employed or the *del credere* agent himself serves as a broker, a brokerage not exceeding six annas per ton may be paid by the colliery owner to the broker or, as the case may be, to the *del credere* agent.

(3) Where in any transaction governed by sub-clause (1) or (2) more than one broker or *del credere* agent is employed, the total of the brokerages or margins charged in respect of the transaction shall not exceed the maximum prescribed in the said sub-clauses and shall be divided between the brokers or agents in such proportion as may be agreed upon.

(4) If any question arises where a person is a *del credere* agent or a broker or both *del credere* agent and broker in respect of any transaction, it shall be referred to the Deputy Coal Commissioner (Distribution) whose decision shall be final.

(5) Nothing in this clause shall apply in relation to a transaction involving less than one wagon load of coal.

7. The Central Government may, by notification in the *Gazette of India*, require every colliery owner to submit, or cause to be submitted by the agent or manager of the colliery, to the Coal Commissioner with the Government of India and to the Chief Inspector of Mines in India such monthly returns, in such forms, and so as to reach them by such dates as may be specified in the notification.

8. The Central Government may from time to time issue such directions as it thinks fit to any colliery owner regulating the disposal of his stocks of coal or of the expected output of coal in the colliery during any period, including directions as to the person or class or description of persons to whom coal shall or shall not be disposed of, the order of priority to be observed in such disposal, and the stacking of coal on Government account.

9. Notwithstanding any contract to the contrary every colliery owner to whom a direction is given under clause 8 :—

(*i*) shall dispose of coal in accordance therewith ;

(*ii*) shall not dispose of coal in contravention thereof.

10. (1) Where a colliery owner has coal available for disposal not covered by the directions issued under clause 8, or where wagons are not available for despatch in accordance with those directions, the colliery owner may, with the general or special permission of the Central Government, stack such coal on Government account.

(2) Where any coal is stacked on Government account under sub-clause (1) or otherwise, there shall be paid to the colliery owner, in addition to the price payable for the coal, a sum for stacking at such rates as may be determined by general or special order of the Central Government.

11. The Central Government may issue such directions as it thinks fit to any colliery owner prohibiting or limiting the mining or production of any grade of coal and the colliery owner shall comply with the directions.

12. No colliery or group of collieries which is or may hereafter be worked as a single mine concern shall be sub-divided and worked in separate parts except with the previous permission of the Central Government and in accordance with such directions as the Central Government may, at the time of granting the permission or subsequently, give to the owner or owners concerned.

13. Any officer authorised by the Central Government in this behalf may, with a view to securing compliance with this Order,—

(*i*) require any colliery owner or his agent to give any information in his possession relating to the production of coal in the colliery ;

(*ii*) inspect or cause to be inspected any mine plans in the possession of any colliery owner or agent ;

(*iii*) enter and inspect any colliery.

14. No colliery shall be opened and no colliery the working whereof has been discontinued over a period exceeding two months, shall be reopened except with the previous permission of the Central Government and in accordance with such directions as the Central Government may at the time of granting the permission or subsequently, give to the owner or owners concerend

15. The functions of the Central Government under clauses 8, 10, 11, 12, 13 and 14 shall be exercisable also by the Coal Commissioner with the Government of India, the Deputy Coal Commissioner (Distribution) and the Deputy Coal Commissioner (Production).

(Sd.) C. L. COATES,
Deputy Secy. to the Govt. of India.

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